PAPER TRADE JOURNAL
Title Reg. U. S. Pat. Off.

Vol. 116, No. 20 Thursday, May 20, 1943 Price Ten Cents

Pulpwood Consuming Committee is Formed

Organization Sponsored by Pulpwood Consuming Mills is Created to Supplement Work of Government Bodies—Committee of Manufacturers is Named—Will Conduct Drive for More Pulpwood.

Organization of the War Production Committee of the Pulpwood Consuming Industries under the sponsorship of pulpwood consuming mills, to supplement the efforts of the War Production Board and the Department of Agriculture Extension Service in increasing supplies of pulpwood on farms for vital war uses, was announced by Frank Block, National Director, at the newly established Committee Headquarters, 30 Rockefeller Place, New York, on May 17.

The committee is composed of H. P. Carruth, vice-president, Union Bag and Paper Corporation; Stuart B. Copeland, president, Northwestern Paper Company; Amor Hollingsworth, president, Penobscot Chemical Fibre Company; H. E. Houghton, vice-president, Brown Co.; R. W. Hovey, vice-president, Oxford Paper Company; H. M. Kieckhefer, secretary-treasurer, North Carolina Pulp Company; David L. Luke, Jr., vice-president, West Virginia Pulp and Paper Company; James L. Madden, vice-president, Hollingsworth and Whitney Co.; Eustis Paine, president, New York and Pennsylvania Company and Vertrees Young, executive vice president, Gaylord Container Corporation. H. E. Brinckerhoff is executive secretary and treasurer of the committee. Rand W. Sutherland will direct the publicity program.

To Conduct Drive for Pulpwood

"An intensive campaign designed to reach every farmer with a woodland in all pulpwood producing areas of the country and emphasizing the need for tremendously increasing quantities of pulpwood for war purposes is already in process of organization," Mr. Block said. "This campaign will parallel and supplement the expanded program of the Pulp and Paper Division of the War Production Board, recently initiated, with the assistance of the Extension Service of the U. S. Department of Agriculture through its Forest Service, Extension Foresters and County Agents. The campaign will be focused upon the education of farmers and the encouragement of increased cuttings of pulpwood as an essential war service.

"Supplies for our own armed services, our allies and for civilian uses in 1943 are at a level considerably in excess of the available supply of pulpwood necessary for the manufacture of products required for the war effort. This shortage is due primarily to increasing drains upon manpower which affect production of pulpwood in woodlands, particularly farm woodlands.

Large Increase in Pulpwood is Required

"Enormously increased quantities of pulpwood will be required this year to make shipping containers, nitrocellulose for smokeless powder, shell and bomb cases, rayon for parachutes and automobile tires, multi-walled sacks and containers for food and other supplies, photographic film and paper, medicinal and medical supplies, plastics for airplane parts, map and blueprint paper, clothing, parts of gas masks, electrical equipment, incendiary bomb fins, hand grenades and hundreds of other special products for military uses.

"More than a million and a quarter tons of paper board—2,250,000 cords of pulpwood—will be used in 1943 to package food, supplies and munitions for overseas shipment alone. The War Production Board estimates that over-all requirement of pulpwood for the year at 13,000,000 cords."

Mr. Block said that the shortage for 1943 probably would be about 25% below that of 1942 and that serious shortages already have developed in sections of the South and Northeast.

"This is the problem that confronts the farmers in pulpwood producing areas of the United States at this critical period in the War," Mr. Block continued. "Farm woodlands produce approximately 38% of the total United States pulpwood supply. In the South, one of the most important producing sections, farmers furnish about 55% of the supply and in several large pulp producing states the percentage of farm produced pulpwood is considerably higher. The War Production Committee of the Pulpwood Consuming Industries has been organized to assist the War Production Board and other Government agencies in overcoming this deficiency in a vital war material.

Pulpwood Vital Material in War

"Approximately 35% of the entire production of pulpwood is now grooved directly into the national war program. At least a quarter of our pulpwood

(Continued on page 20)

Paper Stocks Respond to Optimistic Views

More Favorable Turn of War and Belief That Less Rigid U. S. Price Policies May be Adopted Are Main Bullish Factors—Issues New Model License Form for Cutting Crown Lands—Other News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., May 17, 1943—A marked revival of interest in the paper stocks, with considerable increase in the price of the securities of the major companies from the low point that has prevailed, has taken place in Montreal. This may be partly due to the favorable war news but is also attributed to the impression that less rigid price policies in the United States will prove more favorable for a better price for newsprint this year. New York advices are reported to indicate that some concessions in the matters of price adjustments are not unlikely, and that consideration may be given to arrangements by which paper manufacturers may be compensated for increased costs in recent years. In the newsprint industry the $4 price increase already allowed by U. S. price authorities is regarded as quite inadequate but as indicating a realization of the situation with which the manufacturers are faced. Continuing efforts have been made to obtain further price revision, with June 1 as the date for which special appeal has been made for new prices to become effective.

To Control Cutting of Timber

The Quebec government has issued regulations for a new model license form for cutting wood on Crown lands, and also for the scaling of logs cut on Crown lands.

As regards the license to prevail in the future, it is provided that the licensee has to exploit the forest within the limit, according to a working plan, and each year, before starting any cutting operations, has to secure from the Minister of Lands and Forests the authorization to carry them out. Such authorization will determine the quantity to be cut, indicate the cutting areas and mention the conditions pertaining to the cutting and hauling operations. Ground rents must be paid before September 1 each year. The licensee must furnish before June 30, or, in certain cases, before the drive, a sworn statement together with a report on the cutover area, giving the quantities and the description of the timber cut by virtue of the said license, and also any other information which may be required. The licensee must secure shipping permits before the wood is carried out of his limits. If, concurrently he cuts or buys wood from private lands, he must state so under oath, and give information regarding the quantity and origin of the wood. Such statement will help to determine whether this wood is free or not of stumpage.

Log-Scaling Method Important

As regards log scaling, the preamble to the order-in-council points out that it is important for a sound administration and for the benefit not only of the government, but also of other interested parties, such as forest workers, contractors and industrialists, to have one general regulation for scaling, and to abrogate all other systems. It is, therefore, enacted that wood cut on Crown lands is to be measured, or scaled, by the sole diameter at the small end of the logs. All other dispositions of the regulations, particularly those contained in order-in-council 2750, October 13, 1936, are abrogated, and in future the provisions of order-in-council No. 1255, May 4, is to prevail.

WPB Controls Japanese Tissue

WASHINGTON, D. C., May 19, 1943—Because a large quantity of Japanese tissue is required by the Army, this thin paper was placed under control by the War Production Board today through issuance of Limitation Order L-297.

Japanese tissue is produced only in Japan, and there have been no imports since our entry into the war. The order will serve to obtain information on the current uses of the tissue.

Order L-297 provides that on or before May 20, 1943, all persons having an inventory of Japanese tissue in excess of four reams (100 quires) must advise WPB by filing a letter in triplicate stating the amount of such inventory on May 13, 1943, in both reams and pounds and consumption and/or sales since January 1, 1943 and its end uses. A ream is defined as 288,000 square inches (20 x 30—480) or the equivalent paper area.

Anyone required to file this report under the terms of the order may not commercially use, process, sell or deliver more than 50% of the inventory of Japanese tissue which he had on hand on May 13, 1943, except as specifically authorized in writing by WPB.

The order defines Japanese tissue as any Japanese thin paper (lens or stencil) commonly or commercially known as "Yoshino" or "Tengujo," grades A and B, of weights varying from 37 to 44 ounces per ream and shipped in sizes from 18 inches to 18½ inches or more. Inventory includes any property interest of a person in Japanese tissue regardless of whether or not such person is in possession of the tissue.

Clarifies Paper Conservation Order

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 19, 1943—Paper and Paperboard General Conservation Order M-241 was amended today by the War Production Board to clarify and define certain points and to provide a clear and equitable basis for the classification of paper products for the industry.

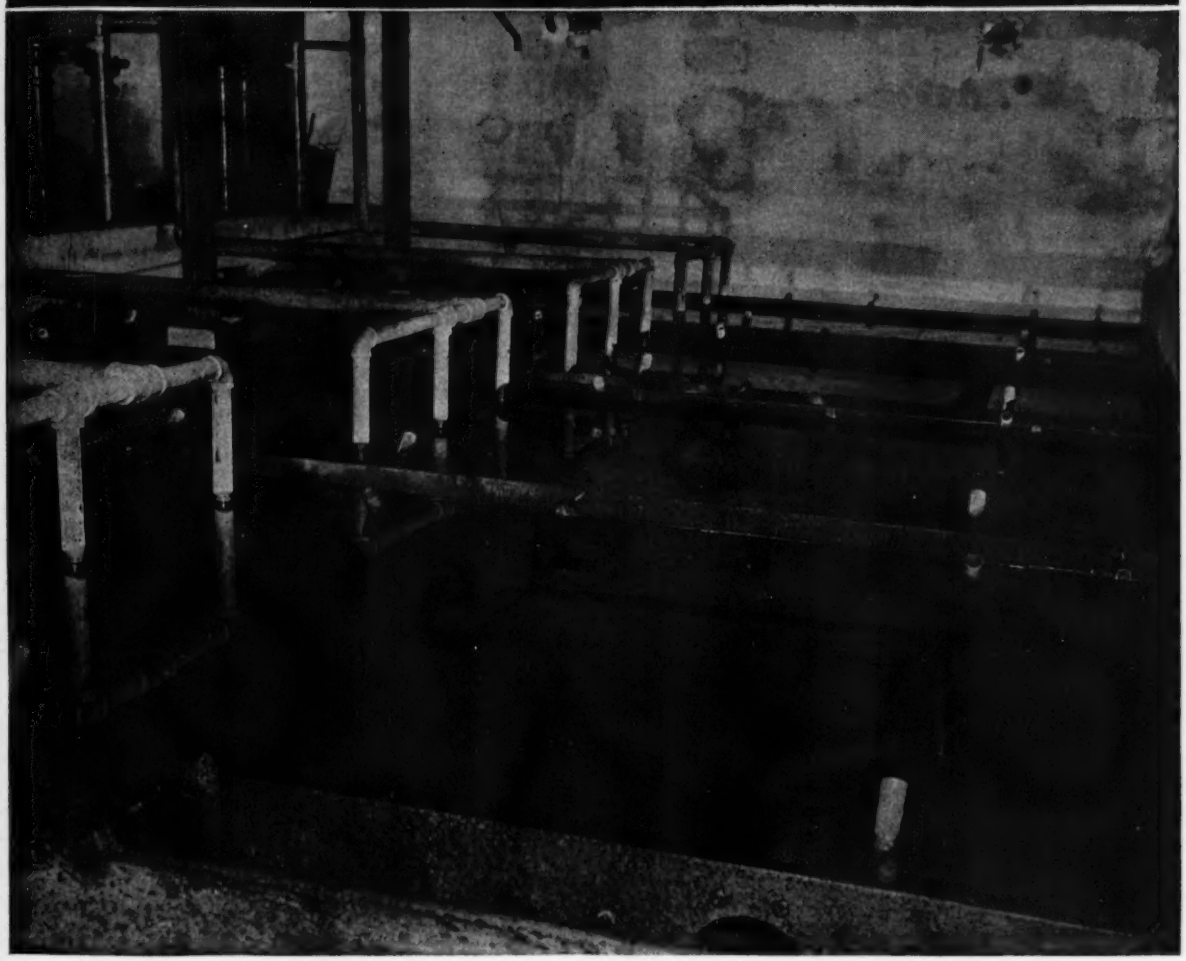
Formerly three unrelated codes were used, but under the amendment a standard classification code set up by the Bureau of the Census early this year and covered by WPB Form 514, dated February 24, 1943, is adopted.

No changes in limitations or amounts of different types of paper to be produced in the current year were made, the order standing as amended in March 12, 1943, in that respect.

The change to Census code numbers will simplify the calculations of paper quotas in the mills and aid in carrying out the production limitation of paper by broad grade classification.

How to Get Better Process Water

Protect Your Process Water With NORWOOD FILTERS For PERFECT Process WATER



Part of the Norwood Filter beds which have been used for years by Strathmore.

Send For Engineering Data Units

We have helpful Engineering Data Units covering Norwood Equipment. Send for your set today.

Filters: Ask for Portfolio F for a complete set of data units on Norwood Water Filters.

Calenders: Ask for Portfolio C for a complete set of data units on Norwood Calenders.

NORWOOD Filters have all the many advantages developed in half a century of working with paper mill men. They will give you perfect process water and help you turn out a better sheet . . . free from spots and specks. Now is the time to investigate . . . to plan for post-war production.

Shipments can't be made "as usual," but we will gladly discuss just what can be done to keep your filters running or bring them up to date. Write us about your process water problems today.

Get a Good Start And a Good Finish With
NORWOOD
WATER FILTERS AND PAPER FINISHING MACHINERY

The Norwood Engineering Company
17 No. Maple St., Florence, Mass.

Member Mills to Confer at Paper Institute

Eighth Annual Conference at the Institute of Paper Chemistry to be Held May 20-21—Plan to Curb Excessive Worker Migration—Bill to Safeguard Insurance Passes—Other Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., May 17, 1943—Executives of member mills throughout the country of the Institute of Paper Chemistry, Appleton, Wis., will hold their eighth annual conference here Thursday and Friday, May 20 and 21. They will make their yearly inspection and will review the teaching and research accomplishments.

Registration will take place Thursday morning and will be followed by a tour of the Institute buildings. A fourth major addition constructed during the last year will be seen by the executives.

At a noon luncheon on Thursday, a report on Institute activities will be made by Westbrook Steele, executive director, and there will be a discussion of technical needs. Several students who are doing research work for their doctor's degrees will also speak.

Joseph Clark Grew, special assistant to the secretary of state and former ambassador to Japan, will be the speaker at a dinner to be given Thursday evening.

Sessions on Friday also will be devoted to the work of the Institute. A golf tournament is scheduled at 3 o'clock each day at the North Shore Golf Club.

To Curb Excessive Worker Migration

Unnecessary migration of workers from one job to another, especially in search of war wages, will be presented in the Wisconsin River Valley papermill area through an area employment stabilization plan set up by the War Manpower Commission. The arrangement was worked out by a stabilization committee of which D. C. Everest, president of the Marathon Paper Mills Company, Rothschild, Wis., is a member. Copies have been sent to all employers.

The plan will facilitate the orderly transfer of workers into jobs where they can be of most value to the war effort. It places the services of the federal government behind the man or woman not being utilized to the utmost in behalf of winning the war and it permits the changing of jobs for such personal causes as compelling individual reasons, unreasonably great distances to travel or because of working conditions substantially less favorable than those prevailing for similar work in the community. The only reason for which a transfer cannot be made is when the individual wishes solely to change jobs in order to get a higher rate of pay for the same type of work. All workers must obtain transfer slips and have them approved.

Employers in the area are prohibited from hiring essential workers except on presentation of a statement of availability issued by the employee's last employer of the federal employment bureau.

Leonard E. Smith Appointed Manager

Leonard E. Smith, Wisconsin Rapids, Wis., has been appointed manager of the Interlake Pulp and Paper Company division of the Consolidated Water Power and Paper Company at Appleton, Wis. He succeeds the late C. K. Boyer, who died about three months ago.

Mr. Smith was with the Nekoosa-Edwards Paper Company, Port Edwards, Wis., for over 35 years and at the time of leaving the firm in 1937 held the position of manager of manufacturing. For the last six years he has lived in retirement.

Arthur G. Heinmiller Goes to Graham Co.

Arthur G. Heinmiller, for four years sales manager of the American Paper Company, Milwaukee, Wis., has resigned to become the Milwaukee representative of the Graham Paper Company of Chicago and St. Louis. He takes the place of Marvin E. Borngesser, who resigned after many years of service, to take up engineering duties with the Taylor Manufacturing Company of Milwaukee.

Gilbert-Mory Nuptials

William Gilbert and Miss Barbara Mory of Neenah, Wis., were married May 12 at St. Margaret Mary Catholic church, Neenah. The bridegroom is serving with the U. S. Army Signal Corps at Washington, D. C. He is the son of George Gilbert of the Gilbert Paper Company, Menasha, Wis.

Bill to Safeguard Insurance Passes

The bill in the Wisconsin Legislature to assure solvency of the state employment insurance fund after the war has been passed by both the Assembly and Senate and has been sent to the governor for signature. It was drawn up by the Wisconsin advisory committee on unemployment compensation.

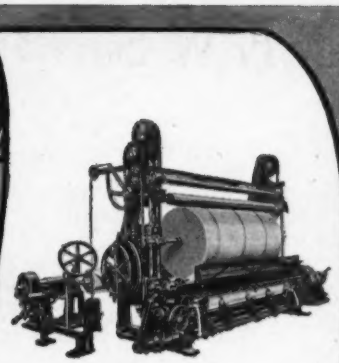
Its four main features are:

All employers are required to pay a special levy of ½ of 1% of payroll through 1945 to establish postwar reserves to meet future liabilities.

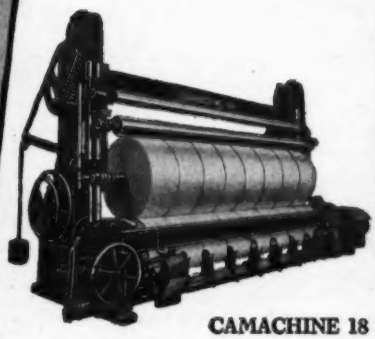
Increased rates, depending upon their employment records in the past, will be paid by those employers whose payrolls have expanded 50% or more over 1940.

Paper Men Resign From WPB

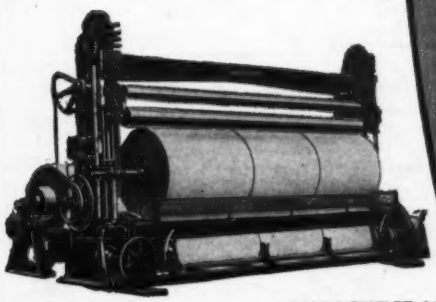
Several officials of the war products development section of the War Production Board's pulp and paper division have resigned to resume their former positions. Among these are John G. Strange, secretary of the Institute of Paper Chemistry, Appleton, Wis., and W. H. Swanson of the Kimberly-Clark Corporation, Neenah, Wis. Mr. Strange has been with WPB in Washington since August of last year, but will continue to serve as a consultant. He will be succeeded in Washington by R. J. Zaumeyer of Neenah, Wis., who has been connected with the war products division of Kimberly-Clark Corporation.



CAMACHINE 14



CAMACHINE 18



CAMACHINE 19

CAMACHINE 20

YOU furnish the **PRIORITY** *We'll furnish the* **WINDER!**

IN common with practically every other machinery manufacturer Uncle Sam's business is now our main concern. We want Uncle Sam to be there "fustest with the mostest."

As a consequence, we have had to turn away many a good friend badly in need of a modern winder but without the necessary priority to permit us to manufacture it.

At times, however, the slitting and roll winding operation becomes a bottle-neck in connection with urgent war production. For instance, tons and tons of wood pulp rolls for nitrating purposes are needed to make explosives to blast the Axis. It's a Camachine job.

Spiral wound tubes for powder and ammunition containers are now being manufactured in volume. Tons of board in narrow width rolls to supply the tube winding machines are needed. It's a Camachine job.

Air and oil filters help to keep our planes flying and our motorized equipment rolling. In mechanized warfare, millions of paper filter discs are needed. These discs are stamped out of specially treated paper. Jumbo rolls of the treated paper are slit into strips of the width required and rewound onto rolls ready to feed the die-cutting machines. Converting jumbo rolls of this paper is a Camachine job. One Camachine does it so fast and so well, that it is sufficient to keep 20 die-cutting presses supplied with paper.

Vital war work such as the above warrants priority, that's why we say, "You furnish the priority and we'll furnish the Camachine."

Write for interesting facts and figures on the Camachines illustrated.

FREE!

The Handy Roll Length Calculator illustrated here is yours for the asking. Write for it today.

CAMERON MACHINE COMPANY
61 POPLAR STREET, BROOKLYN, N. Y.
111 WEST MONROE STREET, CHICAGO

CAMACHINE

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending May 15, 1943

STOCKS

	High	Low	Last
A. P. W.	3	2½	2½
Armstrong Cork Co.	35½	34¾	35
Celotex Corp.	14¼	13⅜	13⅞
Celotex Corp., pf.	90½	90	90
Certain-Teed Products Corp.	7	6⅛	6⅝
Certain-Teed Products Corp., pf.	60	56	57
Champion Paper & Fibre Co.	20	19½	19½
Champion Paper & Fibre Co., pf.	107⅜	106¼	107⅜
Congoleum Nairn Co.	23¾	22¾	23
Container Corp. of America	23½	22½	22½
Continental-Diamond Fibre Co.	14	13	13¾
Crown-Zellerbach Co.	14⅛	14	14⅛
Crown-Zellerbach Co., pf.	93½	91	92
Dixie-Vortex Co.	13⅜	13	13
Dixie-Vortex Co.—A	40⅝	40	40
Flintkote Co.	20⅝	18⅛	20⅜
Flintkote Co., pf.	....	....	....
Robert Gair	3⅞	3⅜	3⅞
Robert Gair, pf.	13⅞	12¾	13⅜
International Paper Co.	12⅞	11¼	11⅜
International Paper Co., pf.	59½	57	58
Johns-Manville Corp.	85	83½	84½
Johns-Manville Corp., pf.	131	130½	131
Kimberly-Clark Corp.	31	29⅝	29⅝
MacAndrews & Forbes	27½	27	27
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	37½	34½	37½
Mead Corp.	9½	9⅛	9⅛
Mead Corp., pf. A—6%	....	....	....
Mead Corp., pf. B—5½%	73	70⅛	72
Paraffine Companies, Inc.	44¾	42	42
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	13⅝	12⅞	13
Rayonier, Inc., pf.	29½	29¼	29½
Ruberoid Co.	23½	21⅞	22½
Scott Paper Co.	43	42	42
Scott Paper Co., pf.	111¾	111	111⅝
Sutherland Paper Co.	30¾	30½	30½
Union Bag & Paper Corp.	10¾	10⅝	10½
United Paperboard Co.	5⅜	5	5
U. S. Gypsum Co.	71¾	68½	70¾
U. S. Gypsum Co., pf.	180	179½	180
West Virginia Pulp & Paper Co.	15¾	14⅝	14⅝
West Virginia Pulp & Paper Co., pf.	107	107	107

BONDS

Abitibi Pulp & Paper Co. 5s '53	67⅛	67⅛	67⅛
Celotex Corp. 4½s '47	102¼	101⅞	102¼
Certain-Teed Products Corp. 5½s '48	99¾	99	99½
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	107½	107½	107½
International Paper Co. 5s '47	103¾	103	103¾
Mead Corp. 3¼s '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	103½	103½	103½

New York Curb Exchange

High, Low and Last for Week Ending May 15, 1943

STOCKS

	High	Low	Last
American Box Board Co.	8⅛	7½	8
Brown Co., pf.	....	..	....
Great Northern Paper Co.	31½	30	30¾
Hummel-Ross Fibre Corp.	4⅞	4½	4½
National Container Corp.	12¾	12	12
St. Regis Paper Co.	4⅝	3½	3¾
St. Regis Paper Co., pf.	133	131	132¾
Taggart Corp.	4¼	4⅛	4⅛

BONDS

American Writing Paper Co. 6s '61	93	92¾	93

Abitibi May Pay More

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., May 17, 1943—Whether the next payment of Abitibi Power and Paper Company to bondholders will be on account of interest only is a question raised as a result of the fact that a lot of Abitibi bonds are tied up in estates and their heirs are permitted to receive interest only as income. These heirs have gone for 11 years without any income on this investment. On the other hand, holders of bonds would be required to pay heavy income taxes, under present schedules, should the payment be defined as interest and not principal.

In view of the prospect of a third payment, subject to court application and approval, the point has been raised in connection with the obligation of the company to pay both principal and interest in U. S. funds, if any holder wants it.

The first two payments by the company to bondholders, aggregating $11,101,410, were made on account of principal only and were payable in Canadian funds only. The proportion of holders residing in the United States is large. Inasmuch as U. S. funds are at a premium of 10%, maximum loss on exchange would be about $1,100,000. The reduction in principal amount of the bonds outstanding, therefore, would not be $11,101,410, but that amount less the loss on exchange.

Financial Counsel, commenting on the reported payment by Abitibi, says it is understood that it will be larger than either of the two previous ones and will be handled in such a way as to meet the obligation for the equivalent U. S. currency, whether the payment is one on the principal or interest.

It is calculated, on the basis of operating results reported officially earlier in the year that profits for the year 1942 were in the neighborhood of $8,000,000, before depreciation, bond interest and taxes. At the end of 1941 net working capital stood at $22,472,889. Allowing for the 1942 payment on principal of $4,826,700, the indicated amount at the end of 1942 would be close to $25,000,000, exclusive of proceeds from the sale of the Espanola plant, but before provision for income taxes.

International Nets $2,023,118

Richard J. Cullen, chairman of the International Paper Company, in submitting the statement of profit and loss for the quarter ended March 31, 1943, states that:—"Net profit for the first quarter of 1943 amounted to $2,023,118. This figure does not reflect the net loss of foreign subsidiaries (amounting to $114,092) which has been transferred to reserves in accordance with policy adopted at close of 1942. No provision for special obsolescence is included in the attached statement for either 1943 or 1942. Provision was made at the rate of $200,000 a month for the year 1942 as a whole, but this was effected on a retroactive basis later in the year. The reserve for obsolescence at December 31, 1942 appears adequate on the basis of government curtailment requirements as they exist today. Provisions for income and excess profits taxes for the first quarter of 1943 has been made on the basis of existing laws. Appropriate adjustments will have to be made later in the year if further changes are made in the tax laws. The company has no way of determining whether or to what extent its net profits may be affected by possible renegotiation of contracts under provisions of the Sixth Supplemental National Defense Appropriation Act."

U. S. Gypsum Nets $1,048,342

The United States Gypsum Company and subsidiaries for the March quarter, reports a net profit of $1,048,342, or 76 cents a common share, against $1,141,894, or 84 cents a share, last year.

"Alltogether dis-fellow box belong kigh-kigh he dry-bone!"

Ask the Marines . . . they know what this means. It's Pidgin English* . . . Solomon Islands talk . . . and it means:

"All these boxes of food are tough!"

They have to be. It takes tough containers to supply a tough army. That's where the "plug" comes in. "Plug" is radio English for "commercial."

Tough, weatherproof corrugated boxes that are acceptable to the Government for specified shipments abroad are being made by the use of Stein-Hall adhesives in which resins are incorporated. So the Stein-Hall Starch Combining Process for manufacturing corrugated board is helping the fight for Victory.

Talk-talk belong me-fellow he-finish – meaning, as you thought . . . "Our story is ended."

*"Pidgin is not 'corrupt' English. Its grammar is simple, but its rules are as firmly fixed as those of the best English" - from MELANESIAN PIDGIN ENGLISH, published by Linguistic Society of America.

If you'd like an original suitable-for-framing print of Brussel-Smith's wood engraving (right) drop a line to Stein, Hall.

The Stein-Hall Process

STEIN, HALL & CO., INC.
285 Madison Ave., New York City

STEIN, HALL MFG. CO.
2841 South Ashland Ave., Chicago

Government Paper Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 19, 1943—Walker Goulard Plehn Company has been awarded the contract for furnishing 45,814 pounds of 25% rag, yellow bond paper at 14.75 for the Government Printing Office. Other paper awards announced by the Printing Office recently include the following. The same firm will also furnish 24,007 pounds of white sulphite ledger paper at 10.5 cents.

Marquette Paper Company will furnish 250,000 pounds of ground wood offset paper at 6.10 cents and R. P. Andrews Paper Company will furnish 60,000 pounds of lined box board at 2.98 cents and Barton, Duer & Koch Paper Company will furnish 296,000 pounds of chemical wood white mimeograph paper at 6.68 cents. Walker Goulard Plehn Company will furnish 3,500 sheets of white offset book paper at 10 cents per pound.

Bulkley, Dunton & Co. will furnish 129,000 pounds of chemical wood white manifold paper at 9 cents and the Marquette Paper Company will furnish 202,240 pounds of ground wood white writing paper at 6 cents. Bermingham & Prosser Company will furnish 33,800 pounds of dull coated book paper at 9.15 cents and Wilcox-Walter-Furlong Paper Company will furnish 85,500 pounds of white antique book paper at 7.3 cents. Barton, Duer & Koch Paper Company will furnish 124,800 pounds of rag white nautical chart paper at 15.45 cents.

Franklin Research Company will furnish 107,800 pounds of 50% rag white nautical paper, 30 x 42 at 18.5 cents. Same firm will also furnish 137,800 pounds of 50% rag, 35 x 46 same; 72,700 pounds of same 34 x 50 and 96,300 pounds same 30 x 50 all at 18.5 cents.

Barton, Duer & Koch Paper Company will furnish 1,400,400 pounds of manila calendered tabulating paper at 8¼ cents and the Marquette Paper Company will furnish 139,075 pounds of white chemical wood manifold paper at 8.59 cents. Central Ohio Paper Company will furnish 102,400 pounds of 25% rag white ledger paper at 12.9 cents and Frank Parsons Paper Company will furnish 115,000 pounds of white ground wood supercalendered book paper at 5.75 cents. Mudge Paper Company will furnish 52,700 pounds of white drumhead manila paper at 17.75 cents.

Barton, Duer & Koch Paper Company will furnish 1,208,700 pounds of white machine coated book paper at 5.90 cents and the Mudge Paper Company will furnish 87,200 pounds of drumhead manila paper at 18.5 cents. Frank Parsons Paper Company will furnish 37,323 pounds of chemical wood white manifold paper at 9.6 cents and the Stanford Paper Company will furnish 291,000 pounds of map paper high wet strength at 14.9 cents.

Frank Parsons Paper Company will furnish 50,400 pounds of white titanium dioxide sulphite writing paper at 9.60 cents and also 224,000 pounds of same

We're in it for the duration
SINCE 1828
We have served the industry well, with the finest in Paper Mill Machinery.
NOW
our entire manufacturing facilities are engaged in turning out material for the mightiest and most formidable fighting machine our country has ever known.
While we cannot give you typical peacetime SW Service, we can supply you with replacements — under proper priority rating, of course.
THE SMITH & WINCHESTER
MANUFACTURING COMPANY
PLANT AND OFFICES AT SOUTH WINDHAM, CONNECTICUT

EMERGENCY LANDING — Protected by Paper

Supplies for a distant fighting force—on a South Pacific Island, on a North African Coast. No docks to use. No time to lose. Into the surf they must go—thousands of cases of food, clothing, munitions. Hours and days must pass before they can be collected. And the contents must be protected.

That urgent problem was solved by the paper industry—with sturdy water-proof packing that withstands the ravages of the sea, the crushing impact of the breakers and the shore.

Millions of tons of paper are protecting such shipments safely to their destination, releasing lumber and metal for critical needs, saving weight and precious shipping space.

Thus has the essential paper industry made another major contribution to the service of supply, to the winning of the war.

KENWOOD WOOL PRODUCTS

F. C. Huyck & Sons is proud to be serving an industry so essential to the war program. Our skill, our facilities and our 72 years of experience are always available in solving the special felt problems created by urgent wartime paper needs.

F. C. HUYCK & SONS

Kenwood Mills

Albany New York

at 9.85 cents. The Marquette Paper Company will furnish 94,500 pounds of poster paper at 7.30 cents and the R. P. Andrews Paper Company will furnish 94,500 pounds of same at 7.35 cents. National Pulp and Paper Company will furnish 44,000 pounds of wood manila paper at 4.65 cents. Stanford Paper Company will furnish 72,800 pounds of 39 x 54 white English finish book paper and 87,450 pounds of same 35 x 48 at 6.44 cents.

Eastern Corporation will furnish 128,000 pounds of chemical wood yellow writing paper at 8.1 cents; also 92,000 pounds of pink chemical wood writing paper at 8.1 cents and also 115,000 pounds of same yellow at 8.1 cents. Frank Parsons Paper Company will furnish 139,075 pounds of white chemical wood manifold paper at 9.6 cents and the Old Dominion Paper Company will furnish 64,800 pounds of 25% rag, mimeograph paper at 9.34 cents.

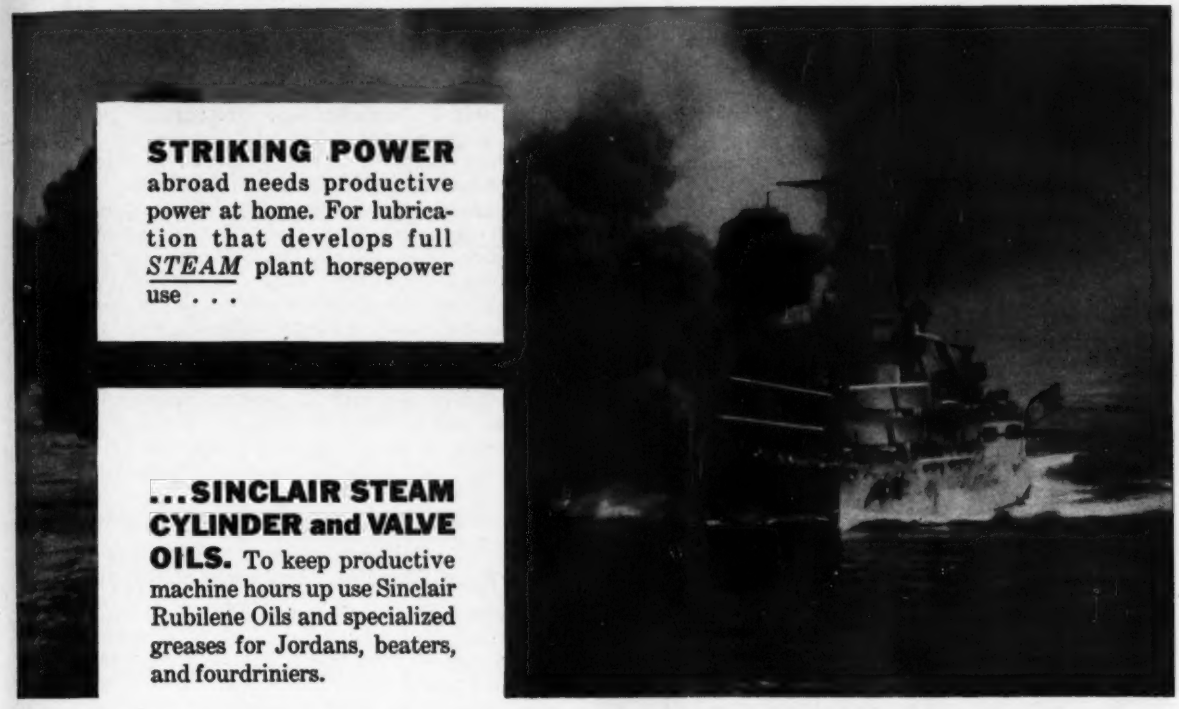
The Cauthorne Paper Company will furnish 118,200 pounds of 25% rag, mimeograph paper at 9.19 cents and Crocker, Burbank Paper, Inc., will furnish 1,000,000 sheets of task force map paper at $43.50 per M sheets. Frank Parsons Paper Company will furnish 100,443 pounds of white chemical wood bond paper at 10.88 cents and also 57,000 pounds of buff super ground wood writing paper at 6 cents.

Central Ohio Paper Company will furnish 57,050 pounds of 25% rag, white ledger paper at 12.99 cents and 23,400 pounds of same at 12.99 cents. Also 40,750 pounds of same yellow at 13.36 cents. Same company will also furnish 8,080 pounds of 25% rag yellow bond paper 44½ x 68½ at 14.75 cents 10,100 pounds of same white 44 x 68" at 14.50 cents and 5,662 pounds of 50% rag, white 40⅝ x 64½ at 16.25 cents.

Barton, Duer & Koch Paper Company will furnish 71,750 pounds of green sulphite writing paper at 7.85 cents and R. P. Andrews Paper Company will furnish 30,000 sheets of Carsign board white litho coated one side at $102.55 per M sheets and 30,000 sheets same at $77.40 per M sheets.

The Cauthorne Paper Company will furnish 31,527 pounds of white chemical wood writing paper at 7.5 cents and Frank Parsons Paper Company will furnish 40,000 pounds of yellow ground wood writing paper at 6.65 cents. Stanford Paper Company will furnish 320,000 pounds of 25% rag, white bond paper at 12.53 cents and Barton, Duer & Koch Paper Company will furnish 40,000 pounds of 25% rag, white bond paper at 14.25 cents and the same firm will also furnish 40,000 pounds of same at 14.25 cents. Cauthorne Paper Company will furnish 240,000 pounds of groundwood mimeograph paper at 6.5 cents.

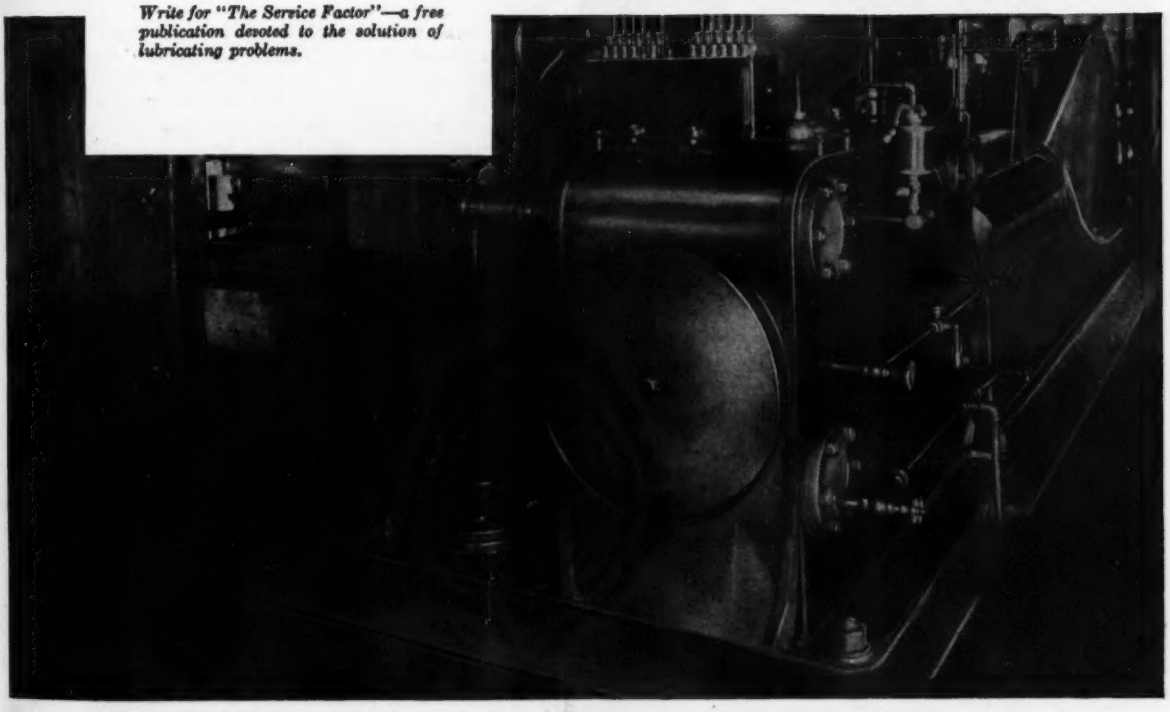
The Cauthorne Paper Company will furnish 90,000 pounds of 25% rag, mimeograph paper at 9.84 cents and Frank Parsons Paper Company will furnish 120,000 pounds of white super ground wood writing paper 34 x 44" and 160,000 pounds same 32 x 42 at 6.40 cents. Marquette Paper Company will furnish 200,000 pounds of 25% rag, groundwood pulp writing paper at 6.40 cents and Bulkley, Dunton & Company will furnish 120,000 pounds of 25% rag, bond paper at 12.88 cents. The same firm will also furnish 80,000 pounds of white sulphite ledger paper at 8.55 cents and Barton, Duer & Koch Paper Company will furnish 32,165 pounds of 50% rag, buff index paper at 13.25 cents.



STRIKING POWER abroad needs productive power at home. For lubrication that develops full *STEAM* plant horsepower use . . .

. . . SINCLAIR STEAM CYLINDER and VALVE OILS. To keep productive machine hours up use Sinclair Rubilene Oils and specialized greases for Jordans, beaters, and fourdriniers.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • Rialto Bldg., Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth

24 x 16 double-cable wire, showing cable warp, running vertically, and cable shute, running horizontally. Magnification about 6½ times.

"Twisted cable"—right away, doesn't that expression suggest something at once flexible and strong? Twisted cable Fourdrinier wire is very flexible and very strong. Every strand consists of six phosphor bronze wires wound around a center core. It is possible by skilful looming to attain the flexibility of a fine mesh wire together with the endurance and drainage characteristics of coarser meshes. This combination of values is ideally suited to the manufacture of heavy pulps, fibre board and wall board. However, cabled wire is not all the same. There are variations to fit individual conditions. Like finer mesh wire, the cable type must be tailored to the product it makes.

THE LINDSAY WIRE WEAVING COMPANY
Serving the Paper Industry Since 1903
14001-14299 ASPINWALL AVE. • CLEVELAND, OHIO

Lindsay **WIRES**
FOR PAPER MILLS

FORM PULPWOOD COMMITTEE

(Continued from page 9)

products this year will go into the manufacture of paper board containers for overseas shipment of munitions, foodstuffs, first aid packets, rations and other war supplies, including special containers for aerial bombs and shells and nitrocellulose to make smokeless powder. An average spruce tree yields enough nitrocellulose to provide smokeless powder for thirty-five 105 mm. shells, or 7,500 rounds of ammunition for a Garand rifle, while one cord of pulpwood will make enough smokeless powder to fire two rounds of a big 16" naval and coast defense guns.

"Increased production of pulpwood is equally urgent for the manufacture of rayon and plastics for a hundred military uses and for paper wrappings and cartons, as well as for newsprint for the daily, weekly and periodical press, for magazines and writing papers. The war has brought more dramatic uses for paper. Today it is used for targets, hospital wadding, styptics, ration books, stamps, posters and government printing of all descriptions."

Farm Woodlot Big Source of Supply

"There are more than 3,800,000 farms in the twenty-seven states now producing pulpwood," said Mr. Block. "Farmers in these areas produce over one-third of our domestic pulpwood supply. The other two-thirds comes from professional cutters. There is no shortage of trees. The shortage is in manpower in the woods. It takes the average farmer about a day-and-a-half to cut a cord of pulpwood. Should the 3,800,000 heads of farm families devote three days to pulpwood cutting in 1943 as an extra service to their country—no further shortages will develop. When the importance of this production to our war effort is brought home forcefully to the American farmer, the Committee feels sure he will cooperate to the maximum of his ability by cutting enough pulpwood to increase production well above our war needs for the year."

R. J. Cullen Made Chairman

The Board of Directors of International Paper Company at a meeting held Wednesday, May 12, created a new executive office, "chairman of the corporation".

R. J. Cullen, president of the Company and its predecessors for the past seven years, was elected to this office and will have general charge of the business and will formulate the plans and policies of the company.

John H. Hinman, vice-president of the company and its predecessors for the past fifteen years, was elected president. He will be the general executive and administrative officer of the company. Mr. Hinman, who has been with the company for over thirty years, has been president of Canadian International Paper Company since December, 1938.

Mr. Cullen stated that because of the tremendous increase in the details of conducting the business of the company, the delegation of some of his executive duties was desirable.

Harrison R. Weaver, who has been vice-president of the company and its predecessors for the past seven years and treasurer for the past twelve years, was elected first vice-president and treasurer. All other officers were reelected.

Get Army-Navy E

In a colorful ceremony which took place at the plant in Worcester, Mass., Friday morning, May 7, the Army-Navy "E" award was presented for high achievement in war production to the employees and management of the Rice Barton Corporation.

In notifying the company of the award, James Forrestal, Under Secretary of the Navy, wrote as follows: "This is to inform you and all employees of the Rice Barton Corporation that the Army and Navy are conferring upon your plant the Army-Navy 'E' Award for outstanding production of war materials. This award consists of a flag to be flown above your plant, and a lapel pin which every member of the Rice Barton Corporation may wear as the mark of an inspiring contribution to the future of our country. Your accomplishment during the past year has set a high standard, yet the Army and Navy have every confidence that your record in the future will raise that standard even higher."

George Sumner Barton, president of the corporation, replied to Under Secretary Forrestal as follows: "On behalf of all the employees of our corporation may I assure you of the sincere appreciation and honor that we all feel at being advised by you on the granting of the Army-Navy 'E' award to our organization. The bestowal of this award will, I am confident, but serve to intensify our zeal and endeavor to turn out as expeditiously as possible the important work that has been entrusted to our company."

Frank C. Smith, Jr., general counsel of the Rice Barton Corporation, was master of ceremonies. The invocation was delivered by Lt. Com. Harry C. Wood, Chaplain of Naval Air Station, Squantum. The address of welcome was made by Hon. William A. Bennett, Mayor, City of Worcester. Greetings from the commonwealth were presented by His Excellency, Leverett Saltonstall, Governor of Massachusetts. The presentation of award was made by Rear Admiral Wat Tyler Cluverius, United States Navy (Ret.) The award was accepted by George Sumner Barton, president Rice Barton Corporation. The presentation of "E" Lapel Insignia was made by Col. S. E. Whitesides, Jr., Commanding Officer Chemical Warfare, Boston. The lapel insignia was accepted by J. Wallace Brown and the benediction was given by Capt. Edward A. Kenealy, Chaplain, Fort Devens.

Six Months versus Twenty Years Service *from Manganese Steel Chain*

This performance report from the tall timber savors so much of a Paul Bunyan tale that we would hesitate to release it if we did not have the evidence in our files.

Back in 1921 the superintendent of a California saw mill consulted our Oakland plant (one of Amsco's six foundries) regarding a chain used as a "hog-fuel" or refuse conveyor. The 1"x1⅝"x6" forged coil chains used for this purpose had been giving only six months service. The superintendent naturally regarded the recurring replacement costs as excessive, and he wanted to know what could be done about it.

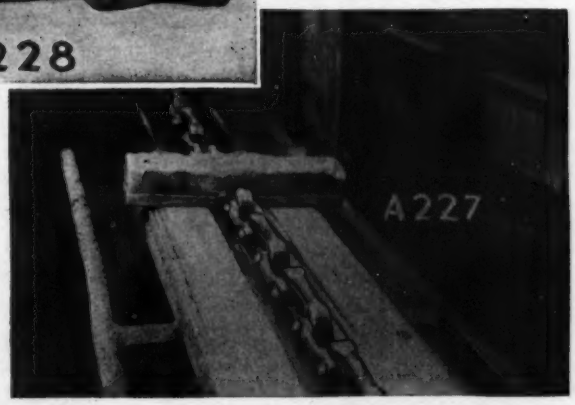
One of the engineers at our Oakland foundry worked out the riveted cast center-link and sidebar design shown in picture A-228, with the same general dimensions as the forged coil chain. The manganese steel chain shown in View A-227 was installed at the saw mill where it has been in service for over twenty years, latterly in log-haul-up duty. How much longer it will last is more than we would venture to predict.

The chain design as much as the durability of "the toughest steel known" figures in the twenty year record, having provided a much larger bearing area than that of the chain which it replaced. This, added to the tough stress resistance and the work-hardening property of austenitic manganese steel, accounts for the phenomenal performance.

The type of chain is now being used throughout the Pacific Coast area, for refuse conveying, log hauls and deck conveyors. Its durability is of particular value right now when conservation of metals is of extreme importance.

Amsco engineers are always prepared to make recommendations where equipment parts are not giving the performance that can reasonably be expected.

Amsco elevating and conveying chains are made in many types. Send for Bulletin No. 742-CN.



Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

THE ORIGINAL
Brake Shoe

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger
EDITOR

Vol. 116 May 20, 1943 No. 20

COMING EVENTS IN PAPER INDUSTRY

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

American Pulp and Paper Mill Superintendents Association, Twenty-fourth Annual Convention, Commodore Hotel, New York, June 15-17.

TO SPEED DELIVERY OF MAIL

In order to expedite the delivery of mail in New York City, numbers have been assigned to the various district post offices. The number of the Paper Trade Journal and Lockwood's Directory of the Paper and Allied Trades is 19. All mail intended for these publications should, therefore, in the future bear this number in addition to the usual address.

CONTROLLING ABSENTEEISM

Absenteeism has always been an important factor in almost all industries. The effect of workers absent for any cause varies and is dependent upon the type of work performed and its particular effect upon other correlated operations which may precede or follow the work performed by the absentee. In mass production methods, workers often perform one type of skilled operation and total production is frequently substantially reduced if any one unit fails to maintain its normal production ratio. Among the literature devoted to the consideration of absenteeism are two new booklets, one issued by the War Production Board and entitled a Guide for Plant-Labor Management and the other entitled Controlling Absenteeism, (Special Bulletin No. 12) issued by the Bureau of Labor Standards, U. S. Department of Labor.

The publication issued by the War Production Board, as part of the War Production Drive, deals with methods effectively used in combating the in-plant causes of absenteeism, and suggests methods for developing community cooperation in handling other similar situations which contribute to lost time on war jobs. In a foreword this booklet states that, "From experience to date it appears that the most effective way to attack in-plant causes is action through in-plant labor-management committees. These committees enable both management and labor to measure absenteeism in the plant, discover causes, and work out mutually satisfactory steps for their elimination." The initial step, explains the booklet, is to appoint a committee in order to get the facts of how many people are absent and why they stay away. The first step of the committee is to determine the rate of absenteeism, which may begin by requesting management to compute weekly rates of absenteeism. One way of doing this is to compute weekly rates by means of continuous daily records for each shift on the number of workers scheduled to work and on the number of workers scheduled to work who are absent. The weekly rate may then be computed as follows: (1) Add daily figures on man-days scheduled for each shift and arrive at a total of all shifts scheduled during week; (2) add daily figures on man-shifts lost and arrive at a total of all shifts lost during week; (3) divide total arrived at in step (2) by total arrived at in step (1). The result will be the percentage rate of absenteeism for that week. It may vary from 1½% to 15% or more. Because some absences are unavoidable the figure can rarely reach zero in a plant of any size. In some plants it may be desirable to compute more refined absenteeism rates, for example, rates for wage earners, and salaried workers, rates by shifts, departments, and by sex.

In the pamphlet, Controlling Absenteeism, the experience of management in some 200 outstanding war plants dealing with absenteeism is summarized. It defines absenteeism and its causes, suggests the approach to reduce absenteeism through personnel management and supervision, which include individual absence reports, reports by foremen, medical reports, interviewing returning absentees and management-labor cooperation. This booklet states that "Absenteeism has always been present in industry. It is serious now because of war labor shortages. Unexpected vacancies on the production line cannot be filled fast enough to maintain output schedules. As our young men have entered the armed services, the demand for labor has brought into war plants many people who are unaccustomed to industrial life—women, older workers, youngsters, boys about to be drafted, and people physically below par. Management and union leaders alike attribute a considerable amount of absenteeism to these people for whom wartime working and living conditions are especially difficult. They are giving their best efforts to their jobs, but often reasons beyond their control make steady performance impossible.

"As more such workers enter war production, absenteeism rates may be expected to rise."

In defining absenteeism the booklet states: "An effective control program must start with a survey of the extent and causes of absenteeism. Such surveys

should be built on common agreement as to a definition. The Bureau of Labor Statistics uses the following definition: Absenteeism is the failure of workers to report on the job when they are scheduled to work. It is broad term which is applied to time lost because sickness or accident prevents a worker from being on the job, as well as unauthorized time away from the job for other reasons. Workers who quit without notice are also counted as absentees until they are officially removed from the pay roll. The Bureau interprets this definition broadly. By 'scheduled to work', the Bureau means any employee normally attached to the labor force of a particular plant even though the worker might be recuperating from an industrial accident or a serious illness."

The booklet discusses control of absentee factors related to the job and the individual, production planning, hours, wages, accidents and occupational disease, industrial fatigue and health, food habits, health transportation, housing, child care and recreation. It states: "It would appear that established concerns with well-developed industrial relations programs control absenteeism more successfully even when they are expanding under the pressure of war orders . . . Nobody really knows what 'normal' absenteeism is or should be. A curbstone estimate has placed it at 2 or 3%. Yet some companies with a 3% rate have set up extensive programs to curtail it—on the theory that any that is preventable is too much. Others with 5 or 6% think it is normal or at least nothing to worry about at the present time."

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1943		Corresponding Weeks—1942	
April 3	88.5	April 4	102.2
April 10	90.2	April 11	98.9
April 17	89.9	April 18	100.8
April 24	89.8	April 25	100.1
May 1	85.7	May 2	99.8
May 8	*91.7*	May 9	98.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8
1943	87.5	88.9	89.5	*88.9*	....	....	....

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1942	80.8	82.8	90.6	86.9	80.1	90.4
1943	....	....	....	....	....	....

COMPARATIVE YEARLY SUMMARIES

	1936	1937	1938	1939	1940	1941	1942	1943
Year to Date..	77.6	89.6	67.5	80.2	85.5	91.3	102.5	*88.9*
Year Average..	80.4	79.8	71.5	83.4	85.6	97.4	90.4	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75
1938	56	63	63	60	60	59	59	60	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	86	88	94	*94*	..	..	..	..	..	..	..	..	..

Week ending April 3, 1943—93
Week ending April 10, 1943—95
Week ending April 17, 1943—96
Week ending April 24, 1943—97
Week ending May 1, 1943—89
Week ending May 8, 1943—96

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

EXPORTERS
OF AMERICAN PULP

TO
BRITAIN
SOUTH AMERICA
AND ALL WORLD MARKETS

LYDDON
& COMPANY
(AMERICA) INC.

51 EAST 42ND STREET
NEW YORK CITY

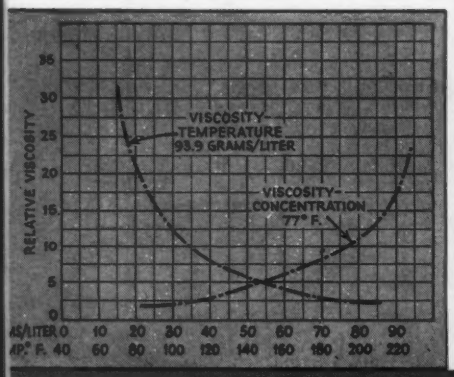
UNIFORM QUALITY CASEIN IMPORTANT TO *Dependable Coating Results*

THE MANUFACTURE OF HIGH QUALITY CASEIN calls for careful processing throughout each step. The first of these is to skim the milk (excess production over what is required for food), and treat it with acid to coagulate the casein. In this operation the temperature and the acid strength have important bearing on the succeeding operation as well as the quality of the final product.

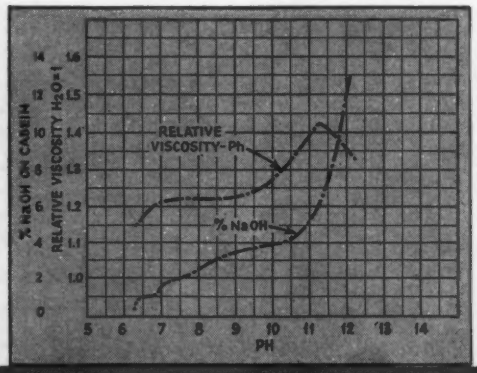
The whey must then be removed and the curd washed. In this step the time between precipitation and washing, plus the efficiency of the washing process itself, likewise affects the quality of the finished casein. Dewatering, grinding, and drying are operations that follow in that order, and each must be carried out with care to produce the best grade of material. When the casein is finally dry, ground, and packed, it is then ready for shipment.

SET GRADING STANDARDS—The casein produced by large manufacturing units is known as *prime* grade, since such plants are usually better equipped to exert the required careful control over operations that maintain uniform high quality. Much casein, however, is manufactured in small plants. This must be shipped to centralization points where it is then graded and blended to secure the desired uniformity. Such casein is designated as *standard* grade. The quality of casein, therefore, depends not only on the care of the original producer but also on the skill and integrity of the blender.

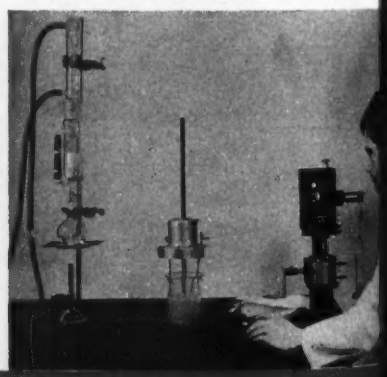
SELECTING SOURCE OF SUPPLY—Cyanamid, for example, has the proper facilities ... the plant, skilled labor, and technically trained supervisory personnel ... to assure the highest standard uniform quality production of casein at all times. All grades . . . muriatic, sulphuric, and lactic . . . as well as various blends of these three types, are available to meet your particular requirements. Since we have been compelled to depend solely on domestic production the supply of casein has not been plentiful, but we have put forth our best efforts to make shipments on schedule. When wartime conditions permit imports, we are exclusive agents for the well-known Dairyco Brand of Argentine casein. Your Cyanamid representative will be glad to discuss your requirements with you.


RELATIVE VISCOSITY
VISCOSITY–TEMPERATURE 93.9 GRAMS/LITER
VISCOSITY–CONCENTRATION 77° F.
GMS/LITER 0 10 20 30 40 50 60 70 80 90
DEG. F. 40 60 80 100 120 140 160 180 200 220

Curves showing relations of viscosity of NaOH casein solutions to concentration and temperature. Viscosity H_2O = 1. Data of Chick and Martin.



Curves showing relation of pH of NaOH casein solutions (1% casein on the weight of water) to viscosity and amount of NaOH added. Data of Jacques Loeb.



In Cyanamid's Paper Chemicals Laboratory, Stamford, Connecticut, many improvements in casein processing have been developed.

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

DISTRICT OFFICES: Boston, Massachusetts; Philadelphia, Pa.; Baltimore, Maryland; Charlotte, North Carolina; Cleveland, Ohio; Chicago, Illinois; Kalamazoo, Michigan; Detroit, Michigan; St. Louis, Missouri; Azusa, California

WAX SIZES • COATING MATERIALS
ROSIN SIZES • SYNTHETIC RESINS
CASEIN • ALUM • CORN STARCH
TAPIOCA FLOUR • SULPHONATED OILS • FILLERS • DEFOAMERS
AEROSOL® WETTING AGENTS and OTHER PAPER CHEMICALS

*Reg. U. S. Pat. Off.

Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
Edited by R. G. Macdonald, Secretary

Freeness of Pulp*

TAPPI Tentative Standard T 227 m-43

The freeness test is a wholly empirical one which gives a measure of the rate at which a dilute suspension of pulp may be partially dewatered. The result depends upon the degree of fibrillation of the pulp, the degree and manner of subdivision of the fibers and their flexibility while wet, which in turn depends on their structural dimensions and composition. Besides these factors, the result is dependent also on conditions under which the test is carried out, such as pressure head, stock concentration, temperature, character of the draining surfaces and construction of the drainage orifices.

The instrument and conditions here described *(1)* were designed to yield a test value primarily suited to the control of the manufacture of groundwood pulp, but which is widely used for following the change in the draining quality of various pulps during beating.

Apparatus

1. *Freeness Tester,*[1] shown in Fig. 1, which consists of a drainage chamber and a rate-measuring funnel mounted on a suitable support.

The chamber is a bronze cylinder, the bottom of which is closed with a perforated brass plate and also with a heavy bronze lid, hinged on one side of the cylinder and latching at the other. The inner side of this lid is covered with a thick, soft-rubber gasket which fits against the flange round the lower side of the perforated plate (screen plate) when the lid is closed. The upper end of the cylinder is closed by a similar lid attached to the shelf bracket in which the cylinder is held when in use. The hinge and latching mechanism are designed to provide an airtight closure, the gasket being put under pressure when the lid is latched shut. An air-cock is inserted in the center of the upper lid, by which air can be admitted to the cylinder at the start of the test.

The cylinder is 4 inches inside diameter by 5 inches inside height (from the upper surface of the screen plate to the rim). The diameter is a critical dimension. The height gives a capacity of slightly over 1000 ml. above the screen plate. The air-cock bore is 3/16 inch. This dimension is not critical but should not be substantially reduced. The brass screen plate is 0.20 inch thick and has perforations of 0.20 inch diameter, spaced 625 per square inch of surface. The plate is mounted so that the burrs of the punched perforations are downwards. It has not been found possible to duplicate these plates by reference to dimensions of the holes, so all plates are standardized by comparison with two pulps against master plates.

The rate-measuring funnel is of 8-inch open-top diameter by 10 1/8 inches overall length (neither dimension critical) and of heavy bronze construction. The main cone is machined on the inside to a 30° slope which flares out into a top cylindrical portion. The bottom (apex) terminates in a carefully machined bottom orifice piece attached to the bottom of the funnel. The funnel is also provided with a side discharge orifice.

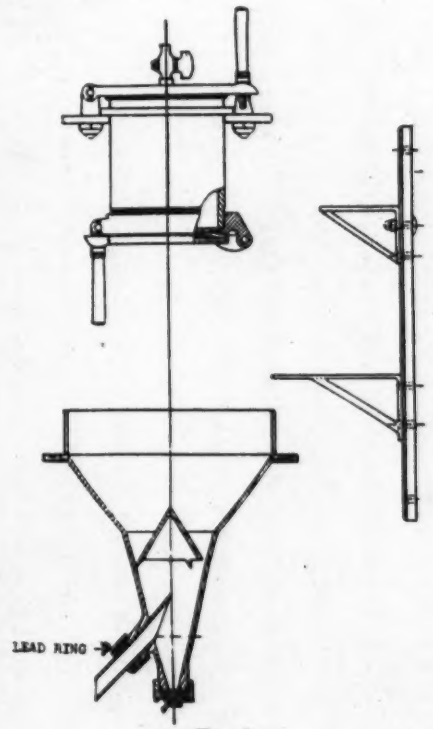


FIG. 1
Freeness Tester

* This method has been approved as a tentative standard by the Pulp Testing Committee. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York, N. Y. Reprints of this standard may be obtained from the Secretary at 25 cents each.

[1] The instrument, known as the Canadian Standard Freeness Tester, is obtainable from the Robert Mitchell Company, Limited, Montreal, Canada, or from their United States agents, Testing Machines Incorporated, 460 West 43rd St., New York, N. Y., or from the Star Brass Works, 104 Dedham St., Boston, Mass. Instruments and parts supplied by the Robert Mitchell Company, Limited, or their agents, Testing Machines Incorporated, are all inspected by the Pulp and Paper Research Institute of Canada, before shipment. The perforated plate used in the cylinder should be compared frequently with plates certified by the Pulp and Paper Research Institute of Canada, Montreal, Que.

The minimum diameter of the opening in the bottom orifice is 0.1200 ± 0.0005 inch. It is designed so as to deliver 530 ± 5 ml. of water per minute when the funnel is fed with slightly more than this quantity 700-750 ml. per minute) so that there is moderate overflow of the excess through the side orifice. The bottom orifice outlet is widened to exceed the minimum diameter so that the flow will not be altered by any minor accidental damage.

The side orifice consists of a hollow tube 0.50 inch inside diameter (not critical) and penetrates the wall of the funnel. The inside end of the tube is cut at an angle to the tube axis so that the upper side of the opening slightly overhangs the lower. The tube is inserted so that the volume between the top of the bottom orifice piece and the overflow level is 23.5 ± 0.2 ml. This volume is not easily measured because of surface tension effects. Its influence on the test is secondary to the rate of flow out of the bottom orifice. The height of the overflow level can be adjusted to some extent by the insertion or removal of lead washers under a shoulder holding the side overflow tube in place.

A detachable protecting spreader cone is supported on three legs inside the funnel to prevent splash from directly entering the side orifice. The cylinder and drainage cone are supported by flanges in openings in two shelves which are mounted on a slate wall panel. The shelves are machined and fitted to the panel and the apparatus is correctly mounted when these shelves are level.

2. *Graduated cylinder* of 1000 ml. capacity with 10-ml. divisions and, if desired, one of less capacity with smaller divisions to suit the pulp being tested.

3. *Standard disintegrator.* This is required when the pulp is not in slush form and is described in Appendix A of TAPPI Standard T 205 m.

4. Suitable bracket and dipper for the stock.

Care of Instrument

The instrument should be kept clean and free at all times from stock accumulations, pitch, oil or grease. After each test the chamber should be rinsed out with clean water. It is particularly necessary to see that no pulp is left in the holes of the screen plate. Before starting any tests, the chamber must be well wetted with clean water. If the instrument is to be left out of use, it should be carefully and thoroughly washed so that no pulp will dry on it. Both top and bottom lids should be left open. Before using again it should be well rinsed with clean water.

The practice of keeping an extra standard screen plate for a reference standard is strongly recommended. The screen plate in current use may then be checked from time to time. With careful use a screen plate has a long life but under usual mill conditions it may become dirty with resin accumulation. The latter may be removed with xylene followed by thorough washing with hot water. *Under no circumstances may acid be used to clean the plate.* Bent or damaged screen plates should be discarded.

When replacing the screen plate care should be taken to avoid any pressure that will squeeze the chamber out of round. A strap wrench rather than a vice should be used to grip it.

The rate of flow from the bottom orifice should be checked from time to time by allowing a stream of water to flow on to the apex of the protecting cone in the funnel at 700-750 ml. per minute and measuring the discharge from the bottom orifice. The latter should be 530 ± 5 ml. per min. If the flow is less than

TABLE I.—FREENESS CORRECTED TO 20° C.

Freeness Read	Temperature of Stock at Test: Points Freeness to be Added											Points Freeness to be Subtracted										Freeness Read
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
30	11	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	11	30
40	12	10	9	8	7	6	5	3	2	1	0	1	2	3	5	6	7	8	9	10	12	40
50	14	12	11	10	8	7	6	4	3	1	0	1	3	4	6	7	8	10	11	12	14	50
60	15	14	12	11	9	8	6	4	3	1	0	1	3	4	6	8	9	11	12	14	15	60
70	17	15	13	12	10	8	7	5	3	2	0	2	3	5	7	8	10	12	13	15	17	70
80	19	17	15	13	11	9	8	6	4	2	0	2	4	6	8	9	11	13	15	17	19	80
90	20	18	16	14	12	10	8	6	4	2	0	2	4	6	8	10	12	14	16	18	20	90
100	21	19	17	15	13	10	8	6	4	2	0	2	4	6	8	10	13	15	17	19	21	100
110	23	21	18	16	14	11	9	7	5	2	0	2	5	7	9	11	14	16	18	21	23	110
120	25	22	20	17	15	12	10	7	5	2	0	2	5	7	10	12	15	17	20	22	25	120
130	26	23	21	18	16	13	11	8	5	3	0	3	5	8	11	13	16	18	21	23	26	130
140	27	24	22	19	16	14	11	8	5	3	0	3	5	8	11	14	16	19	22	24	27	140
150	29	26	23	20	17	14	11	9	6	3	0	3	6	9	11	14	17	20	23	26	29	150
160	30	27	24	21	18	15	12	9	6	3	0	3	6	9	12	15	18	21	24	27	30	160
170	31	28	25	22	18	15	12	9	6	3	0	3	6	9	12	15	18	22	25	28	31	170
180	32	29	26	22	19	16	13	10	6	3	0	3	6	10	13	16	19	22	26	29	32	180
190	33	30	26	23	20	16	13	10	6	3	0	3	6	10	13	16	20	23	26	30	33	190
200	34	31	27	24	20	17	13	10	7	3	0	3	7	10	13	17	20	24	27	31	34	200
210	35	31	28	24	21	18	14	10	7	3	0	3	7	10	14	18	21	24	28	31	35	210
220	36	32	29	25	22	18	14	10	7	4	0	4	7	10	14	18	22	25	29	32	36	220
230	37	33	30	26	22	19	15	11	7	4	0	4	7	11	15	19	22	26	30	33	37	230
240	38	34	31	27	23	19	15	11	8	4	0	4	8	11	15	19	23	27	31	34	38	240
250	39	35	31	27	23	20	16	12	8	4	0	4	8	12	16	20	23	27	31	35	39	250
260	40	36	32	28	24	20	16	12	8	4	0	4	8	12	16	20	24	28	32	36	40	260
270	41	37	33	29	24	20	16	12	8	4	0	4	8	12	16	20	24	29	33	37	41	270
280	42	38	34	29	25	21	17	13	8	4	0	4	8	13	17	21	25	29	34	38	42	280
290	42	38	34	29	25	21	17	13	8	4	0	4	8	13	17	21	25	29	34	38	42	290
300	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	300
310	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	310
320	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	320
330	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	330
340	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	340
350	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	350
360	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	360
370	45	41	36	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	36	41	45	370
380	45	41	36	31	27	22	18	13	9	4	0	4	9	13	18	22	27	31	36	41	45	380
390	45	41	36	31	27	23	18	14	9	4	0	4	9	14	18	23	27	31	36	41	45	390
400	46	41	37	32	28	23	18	14	9	4	0	4	9	14	18	23	28	32	37	41	46	400
410	46	41	37	32	28	23	18	14	9	4	0	4	9	14	18	23	28	32	37	41	46	410
420	45	41	36	31	27	23	18	14	9	4	0	4	9	14	18	23	27	31	36	41	45	420
430	45	41	36	31	27	23	18	14	9	4	0	4	9	14	18	23	27	31	36	41	45	430
440	45	41	36	31	27	22	18	13	9	4	0	4	9	13	18	22	27	31	36	41	45	440
450	44	40	35	31	27	22	18	13	9	4	0	4	9	13	18	22	27	31	35	40	44	450
460	44	40	35	31	27	22	18	13	9	4	0	4	9	13	18	22	27	31	35	40	44	460
470	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	470
480	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	480
490	42	38	34	29	25	21	17	13	8	4	0	4	8	13	17	21	25	29	34	38	42	490
500	42	38	34	29	25	21	17	13	8	4	0	4	8	13	17	21	25	29	34	38	42	500

this, cleaning the orifice piece with xylene followed by hot water should correct it. Attempts to clean the orifice by more drastic means are liable to enlarge it too much. If the rate of flow is too great, a new orifice piece is necessary.

Both the cylinders and funnel parts should be mounted with their tops horizontal. This should be checked with a level when the instrument panel is first mounted.

Before the instrument is sent to the purchaser, the side orifice tube has been properly adjusted by the insertion of lead washers. Do not disturb the adjustment unless it is evident that this tube has become displaced.

Sampling

When dealing with mill consignments, a sample of pulp, the equivalent of about 4 square inches in area, shall be drawn from the interior of every bale included in the official test for moisture. (Portions of samples taken for the moisture test but *not* dried may be used.) The weight of the sample should be at least 50 grams and preferably 100 grams or more of dry fiber.

For slush pulps take a representative sample equivalent to at least 8 grams of dry fiber.

Unless the pulp sampled is in such form, the sample shall be prepared and disintegrated in water as follows:

Test Specimen

Weight out, to the nearest 0.5 gram, a representative sample by *tearing* equal portions from all the samples collected, equivalent to 24 grams of moisture-free fiber. Do not cut the pulp or use cut edges. If the sample is dry, wet it thoroughly with cold water, tear into pieces about one inch square and soak in water for 4 hours; or in the case of a dried sample of mechanical pulp which is to be furnished in the moist form, allow it to soak for 24 hours.

Note: As far as is known, soaking pulp for a longer time than 4 hours, for example overnight, does not appreciably affect the results.

Make the mixture up to 2000 ml. with cold water (1.2% consistency) and disintegrate for 75,000 revolutions (25 minutes) in the standard disintegrator under standard conditions. (*See* TAPPI Standard T 205 m.)

It is essential to have slush or beater pulps completely defibered before making the test, and these pulps should be examined by diluting a small portion to see that the fibers are completely dispersed. If not, then take 8 to 10 grams of the pulp, dilute to 1500 ml. and disintegrate for 7500 revolutions (2½ minutes). This usually satisfactorily disperses any clots that may be present.

Dilute the pulp after disintegration to approximately 0.3% consistency (moisture-free), adjusting the temperature to approximately 20°C. Determine the exact consistency to three significant figures, by filtering 500 ml. of stock through a tared filter paper in a Büchner funnel, drying the pad in a tared weighing bottle at 100-105°C., cooling in a desiccator and weighing.

Note: For most purposes it is not necessary that the sample be exactly 0.3% or that the temperature be 20° C., as the appended Tables I and II permit corrections to be made. In the case of unusual pulps, however, or for research purposes, it is advisable to adjust the temperature and concentration to as near the standard conditions as is possible.

It is necessary that the water used for diluting the sample be sufficiently free from dissolved air, so that small bubbles are not liberated from the water in the pulp mixture. Water taken from high-pressure mains may require to be left standing for several hours or else subjected to a vacuum before use.

TABLE II.—FREENESS CORRECTION TO 0.30% CONSISTENCY

Freeness Read	Consistency of Stock at Test, %																					Freeness Read
	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	
	Points Freeness to be Subtracted											Points Freeness to be Added										
20	..	..	..	..	..	..	..	..	..	..	..	2	3	5	7	9	11	13	15	17	19	20
30	..	..	..	..	..	10	8	6	4	2	..	2	4	6	8	10	13	15	17	19	21	30
40	22	20	18	16	13	11	9	7	5	2	..	3	5	7	9	12	14	17	19	21	23	40
50	25	23	20	18	15	13	10	8	5	3	..	3	6	8	10	13	16	18	21	23	25	50
60	28	25	22	19	17	14	11	9	6	3	..	3	6	9	11	14	17	19	22	25	27	60
70	31	27	23	20	18	15	12	9	6	3	..	3	6	9	12	15	18	21	24	27	29	70
80	33	29	25	22	19	16	13	9	6	3	..	4	7	10	13	16	19	22	25	28	31	80
90	36	31	27	24	21	17	13	10	7	3	..	4	7	10	13	16	20	23	26	29	32	90
100	38	33	29	26	22	18	14	10	7	3	..	4	7	11	14	17	21	24	27	30	34	100
110	40	35	31	27	23	19	15	11	7	3	..	4	8	11	14	18	22	25	28	31	35	110
120	42	37	33	29	24	19	15	11	7	3	..	4	8	11	15	19	23	26	29	33	36	120
130	44	39	35	30	25	20	16	12	8	4	..	4	8	12	15	20	24	27	31	35	38	130
140	46	41	36	31	26	21	17	12	8	4	..	4	8	12	16	20	24	28	32	36	40	140
150	48	42	37	32	27	22	17	12	8	4	..	4	8	12	16	21	25	30	34	38	42	150
160	50	44	39	33	28	23	18	13	9	4	..	4	8	13	17	22	26	31	35	39	43	160
170	52	46	40	34	29	24	19	14	10	5	..	5	9	14	18	23	27	32	36	41	45	170
180	54	48	42	36	30	25	20	15	10	5	..	5	10	15	19	24	28	33	37	42	46	180
190	56	49	43	37	31	26	20	15	10	5	..	5	10	15	19	24	28	33	38	43	47	190
200	58	51	45	38	32	26	21	15	10	5	..	5	10	15	20	25	29	34	39	44	48	200
210	60	53	46	39	33	27	21	15	10	5	..	5	10	16	21	26	30	35	40	45	49	210
220	61	54	47	40	34	28	22	16	10	5	..	5	11	16	21	26	31	36	41	46	50	220
230	62	55	48	41	35	28	22	17	11	5	..	6	12	17	22	27	32	37	42	47	51	230
240	63	56	49	42	36	29	23	17	11	5	..	6	12	17	23	28	33	38	43	48	53	240
250	64	57	50	43	37	30	23	17	11	5	..	6	12	18	23	29	34	39	44	49	54	250
260	65	58	51	44	37	30	24	18	12	6	..	7	13	19	24	30	35	40	45	50	55	260
270	67	59	52	45	38	31	25	19	12	6	..	7	13	19	25	31	36	41	46	51	56	270
280	68	60	53	46	39	32	25	19	12	6	..	7	13	19	25	31	36	41	47	52	57	280
290	70	62	54	47	40	33	26	19	13	6	..	7	13	19	25	31	36	42	47	52	57	290
300	72	64	56	48	41	34	27	20	13	6	..	7	13	19	25	31	36	42	48	53	58	300
310	73	65	57	49	41	34	27	20	13	7	..	7	13	19	25	31	37	43	48	53	58	310
320	75	66	58	50	42	35	27	20	13	7	..	7	13	19	25	31	37	43	48	53	58	320
330	77	68	59	51	43	35	27	20	13	7	..	7	13	19	25	32	38	43	48	53	58	330
340	78	69	60	52	43	35	27	20	13	7	..	7	14	20	26	32	38	44	49	54	59	340
350	79	70	61	52	43	35	27	20	13	7	..	7	14	20	26	32	38	44	49	54	59	350
360	80	70	61	52	43	35	28	21	14	7	..	7	14	20	26	32	38	44	49	54	59	360
370	81	71	61	52	44	36	28	21	14	7	..	7	14	20	26	32	38	44	49	54	59	370
380	81	71	61	52	44	36	29	21	14	7	..	7	14	20	26	32	38	44	49	54	59	380
390	82	72	62	53	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	54	59	390
400	82	72	62	53	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	54	59	400
410	83	72	62	53	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	54	59	410
420	83	72	62	54	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	54	59	420
430	83	73	63	54	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	54	59	430
440	83	73	63	54	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	54	59	440
450	83	73	63	54	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	54	..	450
460	83	73	63	54	45	37	29	21	14	7	..	7	14	20	26	32	38	44	49	..	..	460
470	83	73	63	54	45	37	29	21	14	7	..	7	14	20	26	32	38	44	..	..	..	470
480	83	73	63	54	46	37	29	21	14	7	..	7	14	20	26	32	38	..	..	..	..	480
490	83	73	63	54	46	37	29	21	14	7	..	7	14	20	26	32	..	..	..	..	..	490
500	83	73	63	54	46	37	29	21	14	7	..	7	14	20	26	..	..	..	..	..	..	500

Procedure

Thoroughly clean and wet the freeness tester with water at about the temperature of the stock to be tested. Place the drainage chamber on the upper supporting bracket with its lower lid secured and the air-cock in the upper lid open. Place the graduated cylinder in position to receive the discharge from the side orifice.

Accurately measure 1000 ml. of stock in a clean liter cylinder, taking care with sufficient mixing that this portion is representative. Take its temperature to the nearest 0.1°C. Immediately pour the contents of the cylinder gently into the chamber; close the top lid; close the air-cock; open the bottom lid and, after an interval of 5 seconds from the time that the addition of the stock is completed, open the air-cock to start the flow.

When the side discharge has ceased, record the volume discharged from the side orifice to the nearest ml. When necessary, correct this volume to the standard consistency of 0.3% and temperature of 20°C. by means of the correction tables. It is immaterial which correction be applied first, the second correction being made to the volume adjusted by the first correction.

Make at least two determinations. If they differ from their average value by more than 2%, supplementary tests should be made.

The average of the freeness readings, corrected to 0.3% consistency at 20°C., shall be reported to the nearest 1 ml. The report shall state also the conditions used for disintegrating the sample.

Additional Information

The test was originally designed for use with slush pulp and did not include, as part of the method, any preliminary disintegration. All known methods of disintegration reduce the freeness of pulps, and this reduction is dependent on the freeness of the original stock, the degree of pressing or drying of the laps, the time kept in the pressed condition, and the method of disintegration.

In general, with slush stock for control purposes, or when measuring the freeness of beaten or prepared stock, disintegration should be avoided unless the fibers are not thoroughly dispersed. Where pulps are taken from a shipment for test, even from moist laps or bales, then the standard disintegration procedure of 24 grams in 2 liters of stock for 75,000 revolutions should be followed, as this not only insures complete dispersion of the fibers but also simulates to some degree the defibering treatment the stock will receive in the mill before use.

Literature Cited

1. Technical Section, Canadian Pulp and Paper Association. Official Standard Testing Method 2 (Oct., 1940).

Reference

Second Report of the Pulp Evaluation Committee to the Technical Section of the Paper Makers Association. London, July 1936, 168 p. Especially Chap. 21.

Empire State Meets at Glens Falls

The Hudson River Group of the Empire State Section of the Technical Association of the Pulp and Paper Industry met at the Queensburg Hotel, Glens Falls, N. Y., on Thursday evening, May 6, 1943. Henry W. Fales, manager of the Marinette Paper Company, presided as chairman. Employe Relations and Training were discussed by E. G. Amos, assistant secretary of the American Paper and Pulp Association, and L. G. Thompson of the Marinette Paper Company, South Glens Falls, N. Y.

Although a practice blackout was in progress, the speakers continued their discourses and the discussions proceeded without the benefit of the lighting system.

In his talk, Mr. Amos reviewed the need of the paper industry's cooperation in training to meet the post-war problems. He spoke of the work that will have to be done to fit the returning soldier into the industrial picture and emphasized particularly the need for training in industry to support the American way of life.

He outlined some of the methods being used by paper manufacturing firms to promote training in industry and cited the Scott Paper Company, of which the Marinette Paper Company is a subsidiary, as one which has been particularly successful in the results. He attributed this success in a large measure to persistent effort over a period of years.

Mr. Thompson said the Marinette Paper Company training program is based on the thought that the employe who understands his work better is a better employe for his job and a better candidate for promotion. The Marinette program has shown the employe not only his own job but the relation of that job to the company's whole picture. He said such a program had revealed unknown and unexpected qualities in many workers.

The Marinette program was related to the whole Scott Paper Company program which was designated to secure from within the organization candidates for promotion to jobs opening in a constantly expanding business. Even the preliminary work done at the Marinette Paper Company in the past year had proven the value of telling the employe more about his job, Mr. Thompson said.

F. J. McCourt, chairman of the group, announced that another meeting would be conducted June 3 at The Queensburg, and would be presided over by Dr. K. A. Taylor, head of the research section of the International Paper Company.

Those present included: G. J. Adams, G. M. Adkins, E. G. Amos, C. W. Barwis, W. E. Beazley, R. P. Beaudette, A. B. Copping, H. J. Cronin, W. Curtis, F. P. Duane, R. M. Drummond, V. P. Edwardes, H. W. Fales, S. L. Foster, L. G. Gallup, T. A. Gastonguay, M. B. Gormley, W. Greeley, C. C. Hopson, A. P. Jones, R. Jones, J. W. Joslyn, W. M. Leeson, A. A. Lowe, F. J. McCourt, H. B. McGee, R. D. Moynihan, R. E. Nielson, H. Newell, F. Palmer, A. Prestera, J. L. Renehan, R. J. Robertson, B. J. Russell, C. V. Simmons, W. H. Stark, K. A. Taylor, L. P. Thompson, R. A. Thompson, W. G. Tibbetts, R. J. Trimbey, J. P. VanDusen, M. Wells, G. C. Wolfe and W. F. Jackson.

Helps the Frozen Food Program

WASHINGTON, D. C., May 19, 1943—Restrictions imposed by Limitation Order L-239 on the manufacture of paper boxes for packaging frozen foods have been removed by the order as amended on May 8 by the WPB.

Under the order, paperboard used in folding and setup boxes for packaging frozen foods was restricted to specified thickness. Heavy demand for such boxes has resulted in the development of new types. Today's amendment permits the use of the new type boxes, and helps the frozen food program.

Ink Drying as Affected by Various Paper Stocks*

By Matt J. Leckey[1]

Abstract

Frequently, unexpected results are obtained in the drying process of printing inks. These unexpected results cannot always be traced to the ink itself or to pressroom conditions. Experimentation and experience has shown that paper is often a contributing factor to these unusual phenomena. In this paper, the mechanics and chemical reactions of normal printing ink drying are reviewed and disturbing factors to the normal reaction are discussed. Experimental data, which points to paper as a strong influencing agent upon printing ink drying, is presented. No attempt to establish definite rules, to rectify these conditions, is made. The hope is expressed that mutual cooperation between the paper industry and the printing ink industry will result in the elimination of many drying problems and perhaps even bring about new developments through a close control of paper variables.

Every printer and every lithographer engaged in work with printing inks is familiar with the unexpected results occasionally encountered in the drying process. Extensive research continues in an effort to obtain all the possible information that might be helpful in the solution of these problems.

Experimentation with ink vehicles and films has shown that there are four main ways in which printing ink dries—namely, oxidation, polymerization, penetration, and evaporation. The latter is concerned primarily with gravure and heat-set inks.

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 15-18, 1943.

[1] Research Chemist, Sinclair & Valentine Co., New York, N. Y.

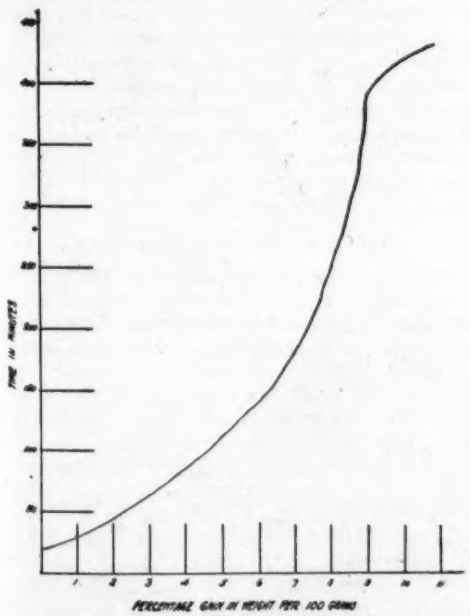


FIG. 1

Gain in Weight of Varnish Film over Given Drying Time

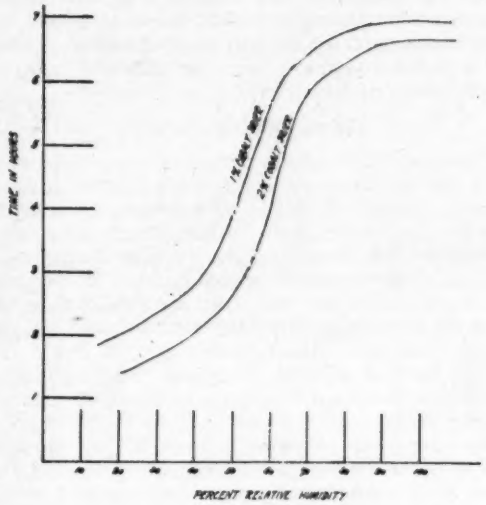


FIG. 2

Effect of Relative Humidity on Drying of Ink Vehicles. Temp. = Approx. 70 Degs. F.

Oxidation and Polymerization of Ink

Oxidation and polymerization are the two chemical reactions which a drying vehicle undergoes in passing from the fluid to the solid state. The fact that a printing ink varnish absorbs oxygen from the air can be proved by the following phenomena.

1. The varnish shows a gain in weight (Fig. 1).
2. The iodine value of the oil is reduced which indicates that the double bonds are being satisfied.
3. A reduction in the length of time required to obtain complete drying is noted in the presence of pure oxygen as compared with the drying time under atmospheric conditions.

Polymerization or the grouping together of molecules to form larger aggregates *(1)* takes place in a drying oil film, together with oxidation. The exact chemical reactions that take place are still somewhat hazy due to the complicated structure of the drying oils, but it is possible to have a varnish pass from the fluid to the solid state by polymerization. Proof of polymerization can be obtained by taking a varnish and heating it in the absence of oxygen. It will eventually solidify and show an increase in molecular weight. Both of these changes point to polymerization *(2)*.

Penetration, except on nonporous surfaces, usually accompanies oxidation and polymerization and aids in the drying process of the ink film. It consists of the absorption of a percentage of vehicle into the stock or paper, leaving an ink film with a high concentration of pigment on the surface which does not smudge or offset as easily as a freshly printed film. News inks depend entirely upon penetration of pigment and vehicle for drying, but this is not true chemical drying.

Printing ink vehicles absorb oxygen from the air, but this process is much too long for practical purposes. To speed up this action, various ingredients are added to the ink. These ingredients are known as driers and consist of metallic compounds of lead, cobalt, and manganese in the form of resinates, linoleates, and naphthenates *(3)*. The action of these driers is believed to be catalytic in nature as they help to carry oxygen to unsaturated oil molecules. Whether or not they are true catalysts is debatable; because there is evidence that the metals have various effects upon the oil, and the acid radical to which the metal is combined exerts an influence upon the effectiveness of the drier*(4)*.

Other Drying Factors

Observation of drying action and experimentation with drying oils show that various factors either accelerate or inhibit this drying action. Among the accelerating factors are sunlight, heat, ozone, ultraviolet, and infrared light, and certain inorganic pigments. High relative humidity, low atmospheric oxygen content, low temperature, antioxidents, and most organic pigments tend to retard the normal drying time of ink vehicles. (See Figs. 2, 3 4.) The drying time is referred to gain in weight which, as previously indicated, can be taken as a measure of drying time.

Because most ink manufactured is used on paper and situations often arise which are difficult to explain with reference to normal or expected results, it is natural to suspect that the stock exerts a strong influence upon the drying reaction. This suspicion becomes reality when we study Table I which shows the drying time of two different inks on several papers. Both inks were run at the same temperature and relative humidity and all other conditions, such as ink film thickness, impression, press rollers, etc., were kept as uniform as possible.

Figure 5 shows graphically these relationships. Ink

TABLE I

INK "A"	INK "B"
Paper No. 1— 2 hr. 10 min.	Paper No. 1—2 hr.
Paper No. 2— 2 hr. 15 min.	Paper No. 2—2 hr. 15 min.
Paper No. 3— 3 hr. 30 min.	Paper No. 3—3 hr.
Paper No. 4— 3 hr. 50 min.	Paper No. 4—3 hr. 15 min.
Paper No. 5— 7 hr. 30 min.	Paper No. 5—5 hr. 30 min.
Paper No. 6—12 hr.	Paper No. 6—7 hr.

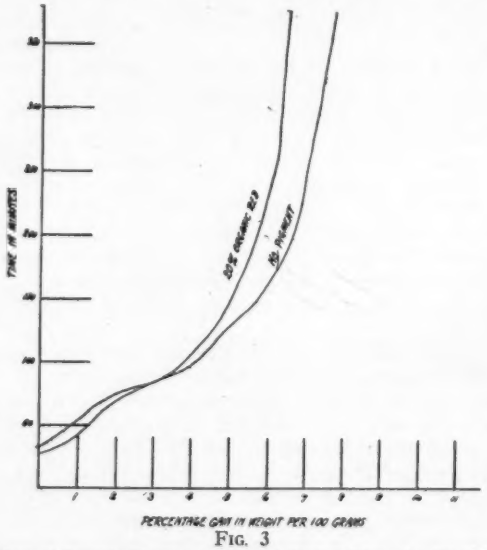


FIG. 3

Effect of Organic Pigment on Normal Drying Time of a Varnish.

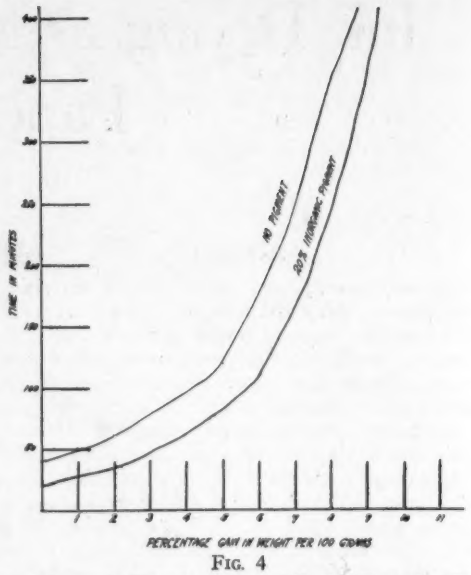


FIG. 4

Effect of Inorganic Pigment on Normal Drying Time of a Varnish

receptivity, moisture content, pH of the paper, coating thickness and its composition, etc. are possible causes for ink-drying variations.

Ink-film receptivity has a definite bearing on ink-drying time. A paper which accepts an ink smoothly will tend to cause the ink to dry faster than a hard and spotty sheet. Porosity is probably the answer here as experiment has shown that an ink will dry on a porous sheet more quickly than on a hard sheet. By penetration of some of the ink vehicle into the paper, a film remains on the surface which has a high pigment concentration and a relatively low varnish concentration. Since only part of the varnish remains upon the surface, the drying time is accelerated *(5)*. It follows therefore that an uneven sheet which accepts the ink unevenly and which has unequal penetration over its surface, will have a slower drying rate than a sheet which accepts the ink smoothly and permits normal and uniform penetration. The porosity of printing papers is controlled by the calendering process and the composition of the paper. The inkmaker can, in most cases, compensate for spotty, hard sheets of uneven penetration in his formulation, but unfortunately he has not always the opportunity to work directly with the stock that will be used in a particular job.

Effect of Relative Humidity

It would be well to emphasize an important point. It is possible to go to extremes and to have an overporous sheet. This is especially true of coated paper, which often results in chalky ink films. Chalky ink films should not be confused with nondrying ink films. An ink may be thoroughly dry and yet be chalky. Such an ink film will rub off the stock very easily. Pigment binding here enters the picture. Chalkiness occurs when a high percentage of the varnish is absorbed by the stock and a relatively small amount of vehicle remains on the stock surface to bind the pigment together. Chalky ink films may occur on normal coated papers during periods of high relative humidity. The high humidity retards the drying and permits the varnish to continue to penetrate for such a long time that eventually the

point is reached where insufficient varnish remains to properly hold the pigment together. Table II shows the drying time of some inks at different relative humidities this indicates that moisture has a

TABLE II.—DRYING TIME

	At 85-90% R.H.	At 50-60% R.H.
Ink A—Black	Indefinite hr.	8 hr.
Ink B—Inorganic Blue	6 hr.	3-4 hr.
Ink C—Inorganic Yellow	5½ hr.	4 hr.
Ink D—Organic Red	8 hr.	6 hr.

direct bearing upon drying time. This leads us to question the possible effect of moisture content in paper itself upon normal drying. Our experience has shown that moisture content in printing papers has a direct bearing upon drying time. The drying time increases in direct proportion to increase in moisture content (Fig. 6). A moist sheet can bring about a chalking such as previously described by retarding the drying until all or most of the binding vehicle has penetrated into the stock. This can be further investigated as the possible cause of different drying reactions from skid to skid of paper under exactly the same conditions. Experience and experimentation shows that the best all-around moisture content in a printing stock is between 4 and 5%; less than that generally results in a stock that does not properly accept the ink. The answer to this can possibly be found in a study of the cappillary action of the paper fibers. There are conditions which prevent keeping stock moisture content between this 4 and 5%, not the least of these is the necessity of making paper conform with the moisture content of shops that have air-conditioning equipment.

Except for isolated cases, we failed to unearth any appreciable change in drying time if the coating composition of coated paper is varied. We do find, however, that coating thickness and porosity exerts a strong influence upon the drying time of a printing or lithographic ink or varnish. A heavily coated sheet of a porous nature causese the ink to set more quickly than a coated sheet of average thickness and low porosity. The latter is the type of coated stock best suited for gloss inks as the ink will ride the surface and thereby maintains a high gloss. Gloss inks depend almost entirely upon the drying properties of the ink itself. Consequently, at the present time, we feel that all other factors

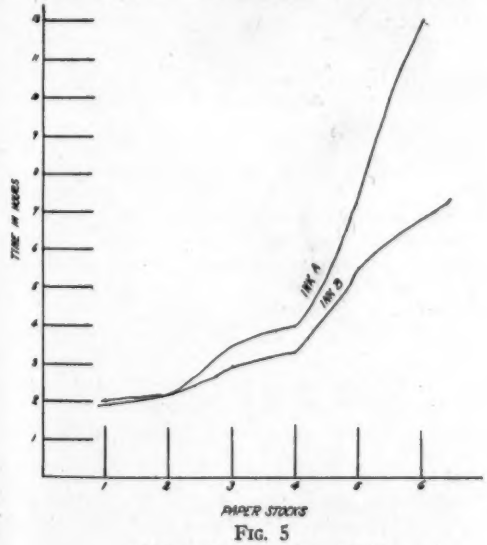


FIG. 5
Drying Time on Various Stocks

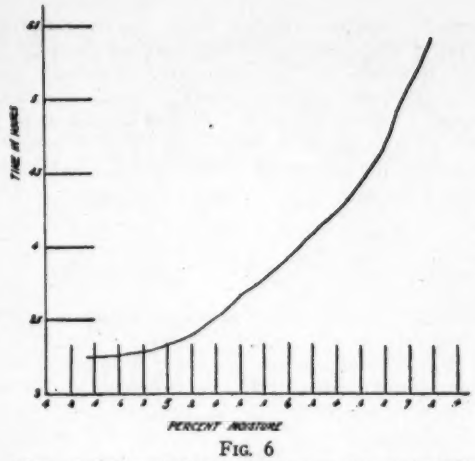


FIG. 6
Effect of Increased Moisture Content on Ink Drying Time

being equal, drying variations on coated sheets of different coating composition is due to unequal penetration rather than the coating itself.

Machine-coated stocks, in which the body stock and the coating is applied in the same operation, show drying variations with changes in coating formulations. The answer to this can probably be found in the fact that the coatings of machine-coated papers occasionally contain ingredients not usually found in regular coated stocks. Ingredients, such as sterates and other soaps are sometimes added to overcome the uneven and spotty coating that is frequently found in this type of stock. When an excessive amount of these materials is added, we have found that drying is delayed far beyond normal time. On one experimental stock, we found that a good drying commercial ink failed to dry for weeks after being printed.

Effect of Glycerine on Ink Drying

It has long been suspected that glycerine content of paper may be a retarding factor to normal ink drying time. Other hygroscopic plasticizers in coatings exert a similar effect. To obtain definite information with reference to these factors, various experimental papers were prepared in which the

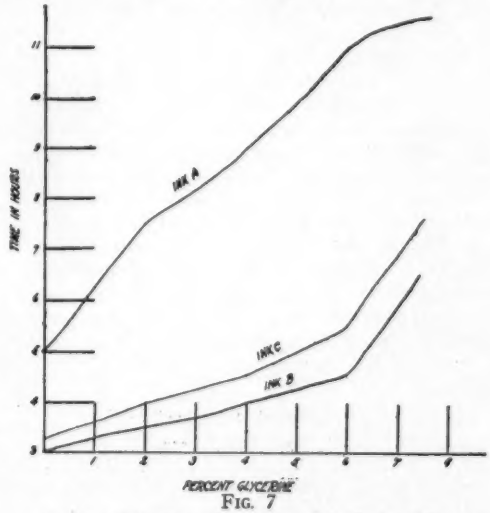


FIG. 7
Effect of Glycerine Content on Ink Drying Time

glycerine content varied. This was accomplished by taking uncoated sheets and soaking them in glycerine solutions of varying concentrations. These sheets, after drying, were used to study the drying time of commercial inks. It was found that the length of drying time increased directly with the increase in the glycerine concentration (Table III).

TABLE III.—GLYCERINE CONTENT

	No Glycerine	0.75%	2.0%	4.0%	6.0%	7.25%
Ink "A"	5 hours	6¼ hr.	7½ hr.	9 hr.	11 hr.	11½ hr.
Ink "B"	3 hours	3¼ hr.	3½ hr.	4 hr.	4½ hr.	6 hr.
Ink "C"	3¼ hours	3½ hr.	4 hr.	4½ hr.	5½ hr.	7 hr.

The pH of paper was also considered as another possible influencing agent upon normal drying time. The pH was determined by taking weighed amounts of representative stocks in the same grade and boiling them for specified periods, then running a pH on the resulting solutions. It was noted that as the pH increases ,the drying time tends to decrease. The same ink will dry more rapidly on a paper of high alkali content (Fig.7). It should be stated here that we have encountered one exception which, as the saying goes, may prove the rule. A stock with a high pH was brought to our attention on which a good commercial ink failed to dry for days. On a similar stock, under identical conditions, the ink dried in a few hours. Although we were unable to definitely prove it, we feel that the alkali materials used have a great deal to do with the unique finding. In spite of this discrepancy and although pH is rather closely controlled in most stocks, we see it can be considered as a contributing cause for drying time variation. Several theories are suggested as an answer to this phenomena. One is that an alkali medium hastens polymerization of drying oils and another is that a saponification between the alkali and acid of the varnish results to a sufficient extent to alter the state of the varnish.

In view of the occasional discrepancies that are encountered in the drying of ink under identical conditions with regard to the ink, temperature, humidity, rollers, presses, and printing area, it is normal to assume that the paper is a contributing factor to these discrepancies. The previously mentioned paper conditions tend to further substantiate this view. Paper must be looked to for the answer why an ink, in the same skid of paper, run on the same press, will sometimes dry in the center of a sheet and not on the ends. This is also true when we find that under identical conditions the ink will dry on one sheet and not on the second or third that immediately precede or follow it into the printing pile.

Perhaps upon further work in cooperation with the paper manufacturer and printers, the printing ink manufacturer will be able to solve all these irritating problems. Perhaps these problems would eradicate themselvese if pH, glycerine content, porosity, moisture content, etc., could be controlled so that in a given skid of paper, they would be absolutely uniform in every given area. Perhaps through research and proper cooperation, these factors can be utilized to bring about instant drying of inks from an entirely different approach than ever previously attempted.

Literature Cited

1. "Chemistry of Organic Compounds", Conant (p. 78).
2. Friend and Alcock, *J. Oil and Color Associate* (1942).
3. Felix Fritz, "Driers and Their Use. *Chemicker Zietung* 60:921, 924.
4. "Driers." Montreal Paint and Varnish Production Club *See* Section Circ. 546:307-325 (1937).
5. Macbeth and Maull, *Photo Lithographer* (March 1939).
6. Benemelis. University of Cincinnati Master's Thesis (1941).

New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Lynn B. Case, vice president and general manager, John Waldron Corp., New Brunswick, N. J.

Richard D. Dunlop, assistant director of research, Monsanto Chemical Company, Plastics Division, Springfield, Mass., a 1933 graduate of Washington University, formerly with Shawinigan Resins Corporation, Springfield, Mass.

Alex R. Entrican, director of forestry, State Forest Service, Wellington, C. 1. New Zealand, a 1919 graduate of University of New Zealand.

Christopher G. Hammond, New England manager, Peter Cooper Corporation, Boston, Mass.

Philip E. Hinkley, secretary, S. D. Warren Company, Boston, Mass., a 1905 graduate of M. I. T.

Edward C. Merrill, assistant vice president, United Drug Company, Boston, Mass., attended Worcester Polytechnic.

Francis G. Morehouse, chemist, National Biscuit Company, New York, N. Y., a 1923 graduate of Yale University.

Robert H. Sams, chemical engineer, Philadelphia Quartz Company, Philadelphia, Pa., a 1941 graduate of University of Kansas, formerly with Lawrence Paper Company, Lawrence, Kans.

Dr. E. Schoenberg, general manager, Upper India Couper Paper Mills, Ltd., Lucknow, U. P. India., a 1923 graduate of Technical College, Brunn, Czechoslovakia, having received his D. Sc. degree in 1927.

Laurence P. Thompson, technical director, Marinette Paper Company, Glens Falls, N. Y., a 1930 graduate of Tri-State College, formerly with International Tissue, Glens Falls, N. Y.

Frank L. Brinkley, supervising pulp mill chemist, North Carolina Pulp Company, Plymouth, N. C., a 1925 graduate of the University of North Carolina.

Harry I. Bussa, bleach room foreman, Champion Paper and Fibre Company, Pasadena, Texas, a 1937 graduate of Rice Institute, and formerly with W. L. Pearson, Corpus Christi, Texas.

Raymond E. Davis, chemist, Crane & Co., Inc., Dalton, Mass., a 1940 graduate of Antioch College and formerly with Lever Bros. Company, Cambridge, Mass.

Francis R. Desmond, color chemist, Claremont Paper Company, Inc., Claremont, N. H., attended Tufts College.

Eugene M. Dow, president, the Parker-Young Company, Boston, Mass., a 1901 graduate of Dartmouth College, with an A. M. degree from Harvard University in 1903, and formerly with the W. L. Thompson Company, Boston, Mass.

James F. Doyle, vice president, Arkell Safety Bag Company, 10 East 40th street, New York, N. Y., a 1913 graduate of Long Island College.

James E. Fenn, chief chemist, The Gummed Products Company, Troy, Ohio, attended the College of the City of New York, nad formerly with Morningstar, Nicol, Inc., New York, N. Y.

William J. Glendon, chemist, Crane & Co., Inc., Dalton, Mass.

Ronald G. Goodwin, pulp and paper chemist, Solvay Process Company, Syracuse, N. Y., a 1941 graduate of the University of Alabama, and formerly with the Taggart Corp., Oswego, N. Y.

Metaphosphate Increases the Washing Efficiency of Chemical Pulps*

By E. R. Lang[1] and E. T. Laurin[2]

Abstract

A recent investigation was made on the effect of metaphosphate solutions on the washing of chemical pulps, and it is the purpose of this paper to present the data of this work. The procedures for preparing sulfate, soda and sulfite pulps are discussed. These pulps are washed with solutions of sodium metaphosphate following digestion and comparative results on bleachability and strength characteristics with water washed pulps are given. The use of sodium metaphosphate in amounts less than 0.2% based on the weight of pulp, in the washing of these chemical pulps realizes an economical saving of chlorine when these pulps are bleached. As a result of this chlorine reduction the bleached strength of the pulp washed with metaphosphate is greater than that of the water washed pulp.

Conservation of bleaching chemicals and preservation of strength characteristics of chemical pulps are of vital importance to the paper industry particularly during these times of world conflict. One possible means of attaining these objectives is through improved efficiency in washing pulp after digestion and before the bleaching stages.

The purpose of this paper is to present the procedures employed and the results obtained during an investigation[3] of the effect of glassy sodium phosphate on washing efficiency.

The glassy sodium phosphate employed was a molecularly dehydrated material containing 66.5% of P_2O_5[4] produced by thermal process from soda ash and food-grade phosphoric acid.

The fundamental properties of this glassy phosphate which might play a part in this washing procedure are

1. It sequesters many metallic ions in the form of soluble complexes.
2. It exhibits a pronounced dispersive action upon finely divided metal oxides and salts.
3. It inhibits the crystallization of many soluble salts, stabilizing a condition of supersaturation.

Preparation and Handling of Pulp

All the pulps used in this study were prepared in a stainless-steel digester equipped with a complete external heating system. The liquor was heated indirectly by means of a hot-oil heat exchanger, and circulated through a complete stainless-steel system.

Sulphate Pulp

The sulphate pulp was prepared under the following conditions:

Dry wood used (southern pine)	3000 grams
Active chemical as Na_2O	20%
Sulphidity	33⅓%
Liquor ratio	5 to 1

The volume of black liquor employed was approximately 44% of the total volume of liquor in the digester and contained 7.5% of the total NaOH requirement as Na_2O.

Cooking schedule—1½ hours to reach 170° C.
3 hours at 170° C.

At the conclusion of the sulphate cook, the pulp was removed from the digester and placed in a disintegration tank, where it was given three washes. The first wash at 75° C. consisted of weak black liquor containing 1.2 grams per liter of caustic soda expressed as Na_2O added to produce approximately a 3% suspension. At the end of 20 minutes the liquor was drained from the pulp and the excess pressed out by hand. In the second and third washes the pulp was again diluted to approximately a 3% suspension with hot water at 75° C.

In the trials when metaphosphate was used, this chemical was introduced into the procedure in the second wash only in an amount equivalent to 0.04% based on the weight of pulp, corresponding to a concentration of 15 p.p.m. The pulp was then given the third hot wash, followed by a cold-water wash, and screened.

The bleachability was determined by a single-stage treatment with calcium hypochlorite commonly known as the "excess chemical method."

The pulp was then bleached using a 3-stage bleaching procedure which consisted of (1) chlorination at a consistency of 3%, a temperature of 25° C. and for a period of 90 minutes; (2) alkaline extraction at a consistency of 10%, a temperature of 40° C. and for a period of 60 minutes; (3) treatment with hypochlorite at a consistency of 5%, a temperature of 35-37° C., a pH of 8.5-9.0, and until the pulp had obtained a brightness of 80% as determined by the Higgins photoelectric colorimeter. The pulp was washed with cold water between each of these stages.

The beater, bursting, and tearing strength tests were then carried out on the unbleached and bleached pulps according to TAPPI Standards.

The freeness was determined by the Canadian standard freeness tester using a 0.3% consistency at 20° C. and the results recorded in cubic centimeters.

Prior to testing, the sheets were conditioned in a constant humidity room, all tests being carried out under standard conditions of humidity and temperature.

Soda Pulp

Soda pulp was prepared under the following conditions:

Dry wood used (mixed hardwoods)	3000 grams
Active chemical as Na_2O	19.5%
Liquor ratio	6 to 1

Cooking schedule—1½ hours to reach 178° C.
2 hours at 178° C.

At the conclusion of the soda cook, the pulp was given three washes in the digester. The first wash was with a weak black liquor, sp. gr. 1.02, and the

---

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 15-18, 1943.

[1] Member TAPPI, Calgon, Inc., Pittsburgh, Pa.

[2] Technical Service, Calgon, Inc., Pittsburgh, Pa.

[3] This investigation was carried out at the New York State College of Forestry, Syracuse, N. Y., under the direction of Professor C. E. Libby.

[4] Supplied commercially under the name of "Calgon". This material is frequently referred to as "sodium metaphosphate" or "hexametaphosphate" although its molar ratio of Na_2O to P_2O_5 actually exceeds somewhat the value of 1 corresponding to the metaphosphate formula of $NaPO_3$.

second wash with a weaker black liquor, sp. gr. 1.006. These two washes were conducted at 75° C. The third wash was with hot water at 85° C. The metaphosphate was introduced into the procedure in the third wash, in an amount equivalent to 0.04% based on the weight of pulp, corresponding to a concentration of 33 p.p.m. The pulp was then removed from the digester, washed with cold water, and screened.

Using a single-stage hypochlorite bleaching process, the chlorine required to raise the brightness of the pulp to 65% was determined.

The testing of the soda pulp was the same as that described above in sulphate pulping.

Sulphite Pulp

The sulphite pulp was prepared under the following conditions:

Dry wood used (spruce)	3000 grams
Sulphite cooking liquor	5.0% free SO_2 1.3% combined SO_2 6.3% total SO_2
Liquor ratio	6 to 1
Cooking schedule—2 hours to 110° C. 4 hours from 110° C. to 140° C. 4 hours at 140° C.—pressure 75 p.s.i.	

At the conclusion of the sulphite cook, the pulp was given four cold-water washes in the digester. Metaphosphate was introduced in all the water used in washing, in an amount equivalent to 0.18% based on the weight of the pulp, corresponding to a concentration of 35 p.p.m. The pulp was removed from the digester, washed with cold water, and screened.

The testing and bleaching of this sulphite pulp was the same as that described above in sulphate pulping, except that only two stages of bleaching, chlorination, and hypochlorite, were used.

An analysis of the water used in all the above trials is given as follows:

	ppm.	epm.[5]
Bicarbonate (HCO_3)	110	1.80
Sulphate (SO_4)	90	1.82
Iron (Fe) (colorimetric)	0.1	0.0036
Calcium (Ca)	27	1.35
Magnesium (Mg)	8	0.66
Suspended Solids (est.)	3–4	...
Soap Hardness	...	2.01
pH Value	7.0	

Discussion of Results

Sulphate Pulp

The effect of the washing with metaphosphate on sulphate pulp can readily be seen in Fig. 1. In the bleachability tests, pulp washed with metaphosphate consistently required less chlorine to attain a given brightness than when metaphosphate was not used. Using a 3-stage bleach to yield a brightness of 80%, 12% less chlorine was necessary as a result of using 0.04% metaphosphate based on the weight of the pulp.

[5] "Equivalents per million", or parts per million by weight divided by the equivalent weight.

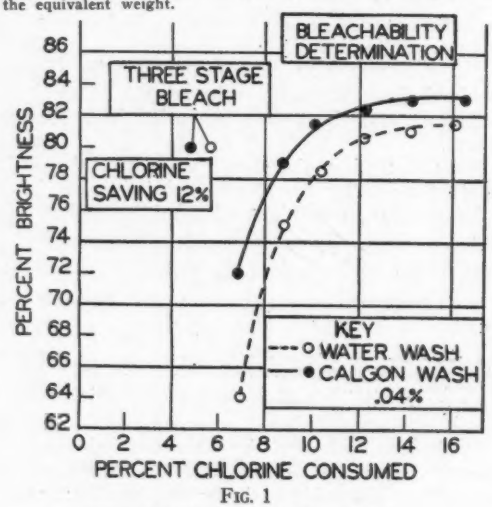


Fig. 1

Calgon Washing of Kraft Pulp at 75° C.

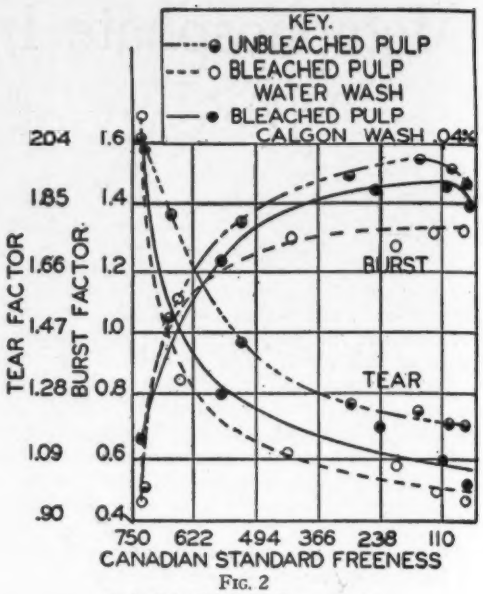


Fig. 2

Kraft Pulp Strength Characteristics

Due to this saving in chlorine the beater strength

TABLE I.—WASHING SULPHATE PULP WITH SOLUTIONS OF METAPHOSPHATE

Metaphosphate used						Actual overall chlorine consumption in 3-stage bleach,* %		
% based on wt. of pulp	Conc., p.p.m.	Unscreened Yield, %	Screened Yield, %	Screenings, %	Bleachability, % Cl to reach pulp brightness of 80%	1st	3rd	Total
...	...	47.4	44.7	0.30	12.0	3.86	1.71	5.57
0.04	17	46.8	44.6	0.35	9.0	3.33	1.57	4.90

* The second stage of bleaching consisted of an alkaline extraction, using 1% of NaOH on the weight of pulp, conducted at 40° C. for 1 hour.

Bleachability Determinations

Water Washed						
Chlorine consumed, %	7.0	8.81	10.49	12.31	14.16	16.09
Brightness	64	75	78.5	80.5	81.0	81.5
Metaphosphate Washed 0.04%						
Chlorine consumed, %	6.98	8.85	10.07	12.56	14.55	16.83
Brightness	72.0	79.0	81.5	82.5	83.0	83.0

TABLE II.—BEATER STRENGTH CHARACTERISTICS OF SULPHATE PULPS

Unbleached Pulp							
Freeness	734	674	520	300	161	100	65
Basis wt. 25x40—500 lb.	40.9	42.7	40.2	42.7	42	42.7	42.3
Burst Factor	0.51	1.05	1.34	1.49	1.54	1.50	1.46
Tear Factor	2.06	1.81	1.43	1.27	1.26	1.21	1.20
Bulk Factor	0.105	0.091	0.073	0.075	0.072	0.068	0.069
Bleached Pulp, Water Washed							
Freeness	740	653	419	203	125	70	
Basis wt. 25x40—500 lb.	44.8	43.1	42.7	42.7	43.4	43.3	
Burst Factor	0.45	1.11	1.31	1.29	1.32	1.34	
Tear Factor	2.12	1.31	1.11	1.10	0.98	0.93	
Bulk Factor	0.111	0.088	0.080	0.075	0.069	0.069	
Bleached Pulp, Washed with 0.04% Metaphosphate							
Freeness	745	572	242	105	57		
Basis wt. 25x40—500 lb.	41.3	42.7	41.6	42.0	43.4		
Burst Factor	0.65	1.23	1.44	1.45	1.35		
Tear Factor	2.06	1.28	1.20	1.09	0.96		
Bulk Factor	0.111	0.089	0.079	0.076	0.069		

characteristics are favorably affected as seen in Fig. 2. The pulp washed with metaphosphate retains 94% of its unbleached strength after bleaching, as shown by the burst factor while the water-washed pulp retains but 86%. An improvement of 8% is obtained on the pulp washed with metaphosphate.

The washing efficiency of hot water is better than that of cold water. However, the advantages shown here with the use of metaphosphate were also obtained when cold water was used.

Soda Pulp

The effect of the washing with metaphosphate on soda pulp can readily be seen in Fig. 3. The employment of 0.04% metaphosphate based on the weight of the pulp saved 12% chlorine when bleaching to a brightness of 65% in a single-stage process.

As a result of this chlorine saving, the metaphosphate-washed pulp was stronger than the water-washed pulp after bleaching, as may be seen from Fig. 4. The pulp washed with metaphosphate and bleached, retained 91% of its unbleached strength as shown by the burst factor, as against a retention of 85% by the water-washed pulp.

Sulphite Pulp

Washing with metaphosphate produced even larger savings in bleach on sulphite pulp than on sulphate or soda pulp, as may be seen from Fig. 5. In a single-stage hypochlorite bleach about 40% less chlorine was required to obtain a brightness of 80% by the application of but 0.18% metaphosphate based on the weight of the pulp as compared to a water-washed pulp.

In a two-stage bleach employing chlorination and hypochlorite, 20% less chlorine was required to bleach the pulp to a brightness of 80% when metaphosphate was used in the washing procedure.

The beater strength characteristics are shown in Fig. 6. The pulp washed with metaphosphate and bleached retained 95% of its unbleached strength as shown by the burst factor while the pulp washed with water retained only 87%, an advantage of 8%

TABLE III.—WASHING SODA PULP WITH SOLUTIONS OF METAPHOSPHATE

Metaphosphate used		Unscreened Yield	Screened Yield	Screenings	Actual chlorine consumption in single-stage hypochlorite bleach to attain pulp brightness of 65%
% based on wt. of pulp	Conc. p.p.m.	%	%	%	
...	..	44.0	42.3	1.76	3.8
0.04	33	43.2	41.2	1.88	3.22

TABLE IV.—BEATER STRENGTH CHARACTERISTICS OF SODA PULP

Unbleached Pulp							
Freeness	500	487	336	243	169	96	81
Basis wt. 25x40—500 lb.	45.2	44.5	44.2	43.7	43.7	42.7	43.4
Burst Factor	0.21	0.49	0.64	0.82	0.85	0.86	0.86
Tear Factor	0.71	1.14	0.99	0.80	0.76	0.66	0.62
Bulk Factor	0.119	0.103	0.086	0.080	0.071	0.070	0.064
Bleached Pulp, Water Washed							
Freeness	602	437	283	188	131	94	
Basis wt. 25x40—500 lb.	43.1	42.0	41.3	41.3	40.9	40.6	
Burst Factor	0.21	0.49	0.70	0.70	0.73	0.73	
Tear Factor	0.90	0.95	0.87	0.79	0.62	0.56	
Bulk Factor	0.12	0.09	0.08	0.07	0.07	0.07	
Bleached Pulp, Washed with 0.04% Metaphosphate							
Freeness	596	436	267	160	120	94	
Basis wt. 25x40—500 lb.	42.7	41.6	41.6	40.6	40.6	40.6	
Burst Factor	0.23	0.52	0.69	0.74	0.76	0.78	
Tear Factor	0.84	1.08	0.88	0.87	0.59	0.52	
Bulk Factor	0.123	0.096	0.082	0.076	0.069	0.069	

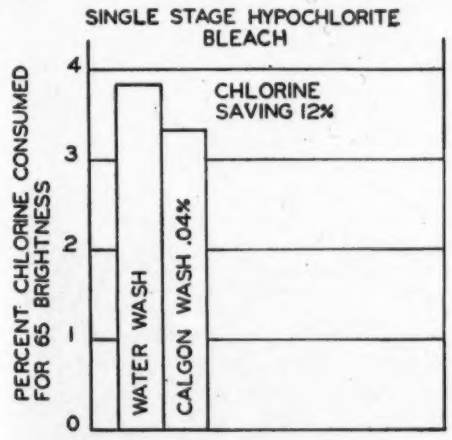


FIG. 3
Calgon Washing of Soda Pulp at 75° C.

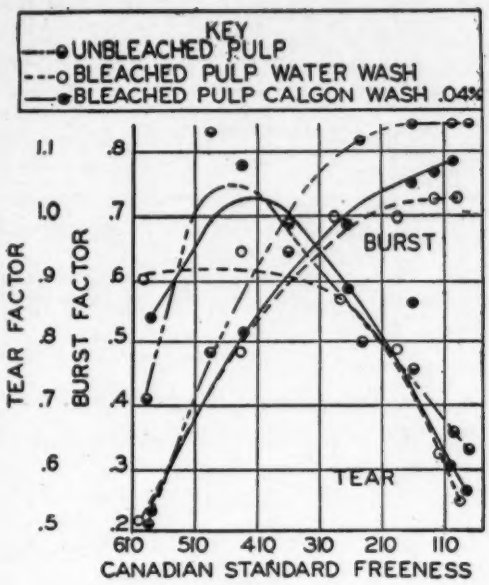


FIG. 4
Soda Pulp Strength Characteristics

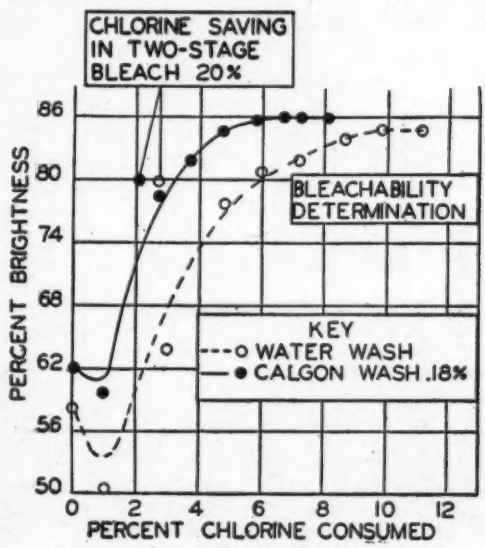


FIG. 5
Calgon Washing of Sulphite Pulp

TABLE V.—WASHING SULPHITE PULP WITH SOLUTIONS OF METAPHOSPHATE

Metaphosphate used: % based on wt. pulp	Metaphosphate used: conc., p.p.m.	Unscreened Yield, %	Screened Yield, %	Screenings, %	Bleachability, % Cl to attain pulp brightness of 80%	Actual overall chlorine consumption in 2-stage bleach, %: 1st	2nd	Total
...	..	48.7	47.1	1.59	5.5	1.46	1.20	2.66
0.18	35	48.9	46.8	1.51	3.2	1.25	0.86	2.11

Bleachability Determinations

Water Washed								
Chlorine consumed, %	1.0	3.0	4.82	6.01	7.26	8.64	9.96	11.08
Brightness	50	64	78	81	82	84	85	85
Washed with 0.18% Metaphosphate								
Chlorine consumed, %	1.0	2.84	3.86	4.88	5.82	6.72	7.14	8.10
Brightness	60	79	82	84.5	85.5	86	86	86

TABLE VI.—BEATER STRENGTH CHARACTERISTICS OF SULPHITE PULPS

Unbleached Pulp							
Freeness	646	410	280	183	120	84	62
Basis wt. 25x40—500 lb.	43.4	44.1	44.1	43.7	43.1	43.1	43.1
Burst Factor	0.97	1.30	1.40	1.45	1.46	1.44	1.40
Tear Factor	1.07	0.73	0.68	0.63	0.55	0.55	0.55
Bleached Pulp, Water Washed							
Freeness	630	370	260	170	105	70	
Basis wt. 25x40—500 lb.	45.5	43.8	43.6	44.0	43.5	44.3	
Burst Factor	1.03	1.23	1.28	1.27	1.24	1.15	
Tear Factor	0.98	0.85	0.73	0.68	0.57	0.56	
Bleached Pulp Washed with .18% Metaphosphate							
Freeness	660	400	280	200	130	100	70
Basis wt. 25x40—500 lb.	44.5	45.5	45.8	44.8	44.8	44.8	46.2
Burst Factor	1.03	1.36	1.38	1.40	1.40	1.38	1.38
Tear Factor	1.05	0.84	0.83	0.75	0.66	0.64	0.58

in the bleached strength of the pulp washed with metaphosphate.

The cuprammonium disperse viscosity of the sulphite pulp seen in Fig. 7 indicates that the pulp washed with metaphosphate and bleached retains 57.3% of its unbleached strength as against 48.4% for the water-washed pulp, an advantage of 9% in the chemical strength of the pulp washed with metaphosphate.

Practical Results in Plant Operation

Successful mill trials on soda pulp have already been made where the metaphosphate was introduced

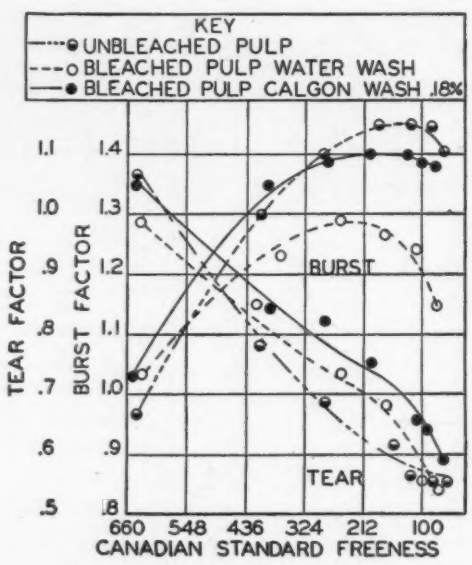


FIG. 6
Sulphite Pulp Strength Characteristics

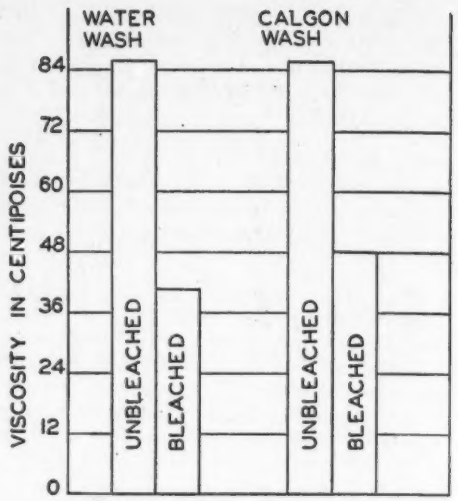


FIG. 7
Cuprammonium Disperse Viscosity of Sulphite Pulps

in the hot wash water at a concentration of 35-40 p.p.m.

The pulp was washed in wash pits with weak black liquor followed by a hot-water wash at 85° C. Over a period of eight days the pulp from poplar chips washed with metaphosphate, when bleached to the brightness of 68-70% previously held in this mill, required between 8 and 9% less chlorine.

On another trial, a mixture of two thirds jack pine and one third hardwood was washed with water at 85° C. containing 35-40 p.p.m. of metaphosphate. Records of the bleach requirement of 72 digesters of this mixed pulp showed a saving of 11.6% in bleach chemicals.

These trials not only reduced the chlorine required for a 70% brightness pulp but produced a better pulp at a lower cost.

TABLE VII.—CUPRAMMONIUM DISPERSE VISCOSITY OF SULPHITE PULP

	Viscocity in Centipoises Unbleached Pulp	Viscosity in Centipoises Bleached Pulp
Water Washed	85.2	41.2
Washed with 0.18% of metaphosphate	85.5	48.9

The role that metaphosphate plays in improving the washing efficiency of chemical pulps cannot be explained with certainty until the impurities in cooking liquors are more definitely defined than at present. We believe that with the use of metaphosphate in the wash water, the removal of coloring matter from pulp is accomplished with greater efficiency.

Conclusions

Treatment of the water for the washing of chemical pulps with small amounts of the sodium phosphate glass known as sodium metaphosphate improves the efficiency of the washing operation.

Because of the improved washing with metaphosphate, less chlorine is required to bleach the pulp to a standard brightness.

Pulp washed with metaphosphate and bleached retains from 6-9% more of its strength than pulp washed with water alone.

Mr. Sulfite Superintendent!

"Summer, with the temperature of cooling water mounting upward, is generally a forecast for the Sulfite Superintendent to look for trouble—trouble that slows up digester cooks or reduces the yields of pulp."

Cooking Acid plus "ESOTOO"

The fortification of acid with *ESOTOO is an important part of the answer for solving summer slumps and for speeding up the cook, particularly of wet wood. Here is a method of controlling free SO_2 percentages, flexible enough to adapt itself readily to the varying demands of production and to emergency application when breakdowns occur. *ESOTOO is immediately available; its use does not depend upon costly, hard-to-obtain or special equipment. Isn't it worth investigation?

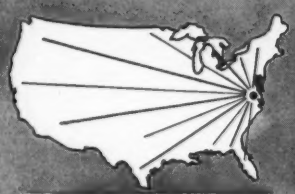
*ESOTOO is Virginia's Trade Name for Liquid Sulfur Dioxide

About Shipments—

Portable cylinders containing 150 lb., semi-portable drums containing 2000 lb. liquid SO_2. L. C. L. or carload.

Carload: 15 drums on multi-unit car frame; 30,000 lb. For users without storage facilities.

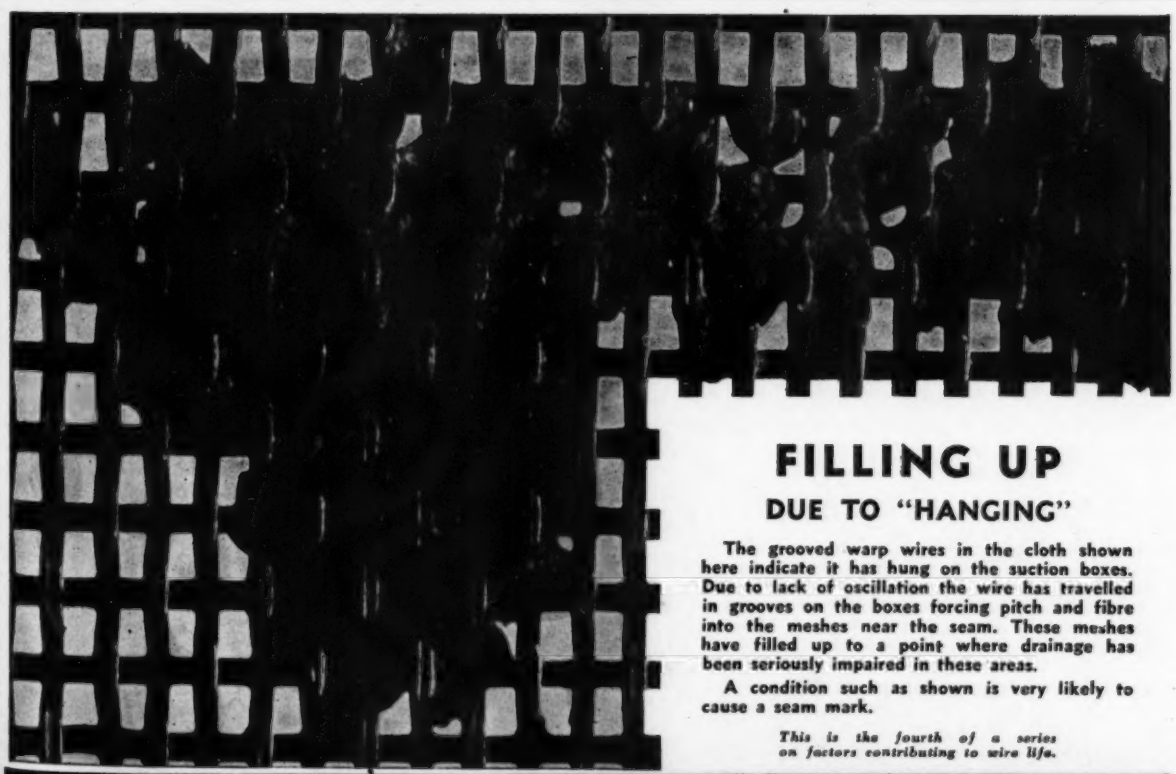
Tank car lots of 40,000 lb. for users equipped with storage facilities.



Prompt shipment from the strategically located works of the largest producer of liquid sulfur dioxide in the U. S.

V VIRGINIA

VIRGINIA SMELTING COMPANY
WEST NORFOLK, VIRGINIA



FILLING UP
DUE TO "HANGING"

The grooved warp wires in the cloth shown here indicate it has hung on the suction boxes. Due to lack of oscillation the wire has travelled in grooves on the boxes forcing pitch and fibre into the meshes near the seam. These meshes have filled up to a point where drainage has been seriously impaired in these areas.

A condition such as shown is very likely to cause a seam mark.

This is the fourth of a series on factors contributing to wire life.

Appleton Wire Works, Inc. Appleton, Wis.

Makes Special Paper Report

WASHINGTON, D. C., May 12, 1943—Representative Boren, of Oklahoma, has made a special paper report in answer to House Resolution 98, as follows:

Pursuant to this resolution, the chairman of the Interstate and Foreign Commerce Committee created this subcommittee by the appointment of the following members of the full committee: Hon. Lyle H. Boren, Oklahoma, chairman; Hon. Lindley Beckworth, Texas; Hon. Francis J. Myers, Pennsylvania; Hon. Richard F. Harless, Arizona; Hon. Charles A. Halleck, Indiana; Hon. Clarence J. Brown, Ohio; and Hon. Charles A. Wolverton, New Jersey.

Hearings held by the committee have established facts which make it desirable that the committee shall promptly file this preliminary report.

War conditions have forced a very substantial reduction in the paper supplies of the country. Recognizing this situation, the Government has heretofore imposed a 10-percent reduction in the use of paper and paper products by private industry. The paper uses of the Nation must be reduced proportionately to this shortage.

The committee is convinced that in view of the necessity of reducing use to correspond to the supply there is a very substantial waste and nonessential use in paper and paper products by various Government agencies.

Therefore, the committee recommends that the War Production Board exercise all its power to eliminate waste and reduce nonessential use of paper and paper products by agencies of the Government.

If the War Production Board finds that additional legislative authority is needed by it to eliminate this waste and nonessential use of paper by the Government agencies, it is suggested that the Board so report to this committee, together with any recommendations for legislation deemed necessary to carry out the above recommendations.

The committee finds that competitive labor market has decreased the labor supply for the production of paper and that the wide use of paper and paper products for essential military uses have further contributed to this shortage of supply. The production of paper is essential to the war effort and the full mobilization of our resources for all-out war.

In view of the military needs and in view of the importance of maintaining the use and full freedom of the press, the committee recommends that the War Manpower Commission and the other agencies involved give every appropriate consideration to classifying paper production as an essential war industry.

States Pulp and Paper are Essential

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 19, 1943—A serious handicap in the paper-making industry and in the procurement of the necessary pulp from which most types of paper is made was removed by the ruling of the War Manpower Commission placing the cutting of pulpwood, and the manufacture of pulp, as well as certain kinds of paper in the categories of essential activities, Arthur G. Wakeman, Director of the WPB Pulp and Paper Division, stated today.

The paper shortage which has confronted the country for some time resulted from shortages in certain types of essential pulp used in the manufacture of paper, and in turn that shortage was due to the fact that not enough suitable wood was being cut, Mr. Wakeman explained.

Carrying the problem one step further, the failure in the woods was directly due to lack of manpower and the fact that while lumbering and woodcutting in general were considered as essential occupations by the WMC, many wood cutters were drafted or transferred to other activities.

With the publication of the Activities Occupational Bulletin, No. 27, which lists the production of pulp, paper board and certain converted products as essential activities and many workers in this industry as in essential occupations, the Pulp and Paper Division believes many of its manpower problems will be materially reduced.

According to information received by Mr. Wakeman from the WMC, all local Selective Service Boards have now been informed that when the list of essential activities was issued in December, 1942, the listing of forestry, logging and lumbering was intended to include "pulpwood cutting," and will now be amended so to read. This interpretation will be of great help to the cutters of pulp wood, it was pointed out, as many in that vocation believing they were not in an essential industry either returned to farming or another essential occupation, thus curtailing the number of available wood cutters, and reducing the production of wood. The consequence of this is, of course, a reduction in pulp and its end product, paper so urgently needed.

Believing that the crux of the paper shortage problem lay in the woods, the War Production Board, through the cooperation of the Committee of Essential Activities of WMC, began a study four months ago to have the cutting of pulpwood declared essential, as well as certain pulp and paper employees. The results seem to justify the time spent in the many conferences necessary to achieve these ends and WPB is grateful to the members of that committee for its cooperation, Mr. Wakeman declared.

Walloomsac Paper Mills Get Plant

About 70 acres in Rensselaer County, N. Y., have been sold by Staiman Brothers of Williamsport, Pa., represented by Louis Rivkin, attorney, to Walloomsac Paper Mills, Inc., represented by L. A. Padula, for an indicated price of $125,000, subject to purchase money mortgage of $75,000. The property is improved with a paper mill and cottages.

Testing Machines in New Quarters

Testing Machines, Inc., have moved to quarters affording more facilities for manufacturing. They are now located at 427 West 42nd street, where they now make instruments they formerly imported. Testing Machines, Inc., carry a full line of testing machines for the pulp and paper industries.

Ned Root Made Junior Lieutenant

E. M. (Ned) Root, sales engineer for the Dilts Machine Works, Fulton, N. Y., has been commissioned a Lieutenant (j.g.) in the Navy, and will leave June 1 for the Naval station at Harvard University.

SOYA PROTEINS

For The Paper Industry

PROSEIN* —mechanically refined soybean protein adhesive product. For use in paper coatings, extending casein in paper coatings, washable wallpapers, sizes, emulsifying and stabilizing waxes, surface sizing and laminating paper. Currently available without priority. Contracts offered.

ALPHA PROTEIN* —our total production of Alpha Protein, the chemically isolated soybean protein, is temporarily required for direct war uses and contract commitments. Enlarged production is under way.

*TRADE MARK REGISTERED U. S. PAT. OFF.

★ **THE GLIDDEN COMPANY** ★

SOYA PRODUCTS DIVISION - 5165 W. MOFFAT ST., CHICAGO, ILL

New York Paper and Pulp Market Review

Demand For Many Grades of Paper Continues Strong—Pulp Market Is Firm—WPB States Pulpwood Shortage Can Be Overcome by Help of Farmers—Waste Paper Market Strong—Cuttings Active.

Office of the PAPER TRADE JOURNAL.
Wednesday, May 19, 1943.

A strong demand for many grades of paper is reported by many manufacturers' representatives, jobbers, and general paper merchants during the current week.

The index of general business activity rose to 140.0, from 135.7 for the previous week, compared with 132.6 for the corresponding week last year. The index of paper board production was 156.3, compared with 134.6 for the preceding week, and with 145.7 for the corresponding week last year.

Paper production for the week ended May 8 was estimated at 91.7%, compared with 98.2% for 1942, with 99.1% for 1941, with 88.6% for 1940, and with 82.0% for the corresponding week for 1939.

Paper board production for the week ended May 8 was 96.0%, compared with 86.0% for 1942, with 84.0% for 1941, with 74.0% for 1940, and with 65.0% for the corresponding week for 1939.

Shipments of war materials rose to a new high in the 1st 1943 quarter, according to the last issue of the Industry Survey, published by the Department of Commerce. In comparison with the 1st 1942 quarter, inventories of manufacturers and retailers declined this year, while wholesalers' stocks have become stabilized at very low levels relative to shipments.

The index of the value of manufacturers' inventories (all industries), for March, 1943, was 174.9, compared with 165.6 for March, 1942. The index of total durable goods for March, 1943, was 210.3, compared with 183.4 for March, 1942; total non-durable goods, 143.9 for March, 1943, compared with 150.1 for March, 1942.

The index of the value of manufacturers' inventories of paper and allied products was 138.3 for March, 1943, compared with 137.8 for March, 1942.

The index value of total manufacturers' shipments of durable goods stood at 328 for March, 1943, compared with 232 for March, 1942; total non-durable goods, 186 for March, 1943, compared with 173 for March, 1942.

The index value of manufacturers' shipments of paper and allied products for March, 1943, was 155, compared with 173 for March, 1942.

Wood Pulp

The pulp market is relatively strong. The manpower situation is widely reported as steadily becoming more critical in the cutting of pulpwood. Donald M. Nelson, chairman of the War Production Board, said last week that the current pulpwood shortage can be overcome if every one of more than 3,800,000 farmers in the 27 pulpwood producing states, were to devote three extra days this year to cutting pulpwood. If this was done, Mr. Nelson said, the threatened 2,500,000 cord pulpwood shortage could be prevented.

Rags

Demand by mills for new white and unbleached cuttings continues relatively light. Colored and fancy shirt cuttings are in active demand at ceiling prices.

Demand for roofing rags continues heavy, with supplies in some grdaes of old cotton rags reported under demand.

Old Rope and Bagging

Old rope, especially No. 1 Manila, is strong and continues in excess of very limited supplies. Ceiling prices prevail.

Trading in scrap bagging continues on a limited scale. Prices are reported rather soft and of a nominal character.

Waste Paper

Mill buying of waste paper is reported active at this date, with all grades at ceiling levels. Current prices on No. 1 mixed and on folded news, are less firm than on the other grades, but continue at the maximum level.

Twine

The twine market is active. All the higher grades of hard and soft fiber twines and cordage are scarce for general civilian uses. Prices are very firm.

Reports on Wood Pulp Output

Wood pulp production in the United States in the first quarter of 1943 was about 18.5% lower than in the comparable period of 1942, according to Fred G. Stevenot, president, Puget Sound Pulp and Timber Company. Production of chemical pulps declined 17.5% and of mechanical pulp, 22.8%.

Comparative tonnage records for first quarter periods were: all grades combined, 2,268,000 tons in 1943 and 2,784,000 tons in 1942; all chemical grades, 1,843,000 tons in 1943 and 2,233,000 tons in 1942; mechanical pulp, 425,000 tons in 1943 and 551,000 tons in 1942.

"Shortage of logs and manpower were the main causes of lower production in the winter months of 1943," Mr. Stevenot stated, "and this led to restrictions now in effect on paper consumption by publishers."

Extremely bad weather in the winter just passed forced suspension of logging in the Pacific Northwest for about two months, instead of the usual two or three weeks, Mr. Stevenot reported. Log inventories shrunk virtually to the vanishing point, causing sharp reduction in pulp production in the region.

"Now that good weather prevails, concerted and successful efforts are being made in Washington and Oregon to return experienced loggers to the woods," Mr. Stevenot declared, "and it is hoped that equally effective efforts will be made in British Columbia. Somewhat normal logging operations have been resumed in our own Pacific Northwest, inventories are being built up, and the Puget Sound pulp industry is looking forward to augmenting domestic log production with shipments from Canada. However, the date of resumption of such shipments is still uncertain."

HERMANN CLAFLIN REFINER FOR

Maximum Strength Development with Minimum Cutting. Develops High Mullen with High Tear and at High Freeness.

o□o o□o o□o

Special Hydrating Filling Particularly Advantageous for Kraft Pulps and Furnishes Requiring Long Beating.

o□o o□o o□o

Replaces Beaters and Jordans.

o□o o□o o□o

Due to Results Achieved with No. 2 Size Plans are being made for a Larger Size.

o□o o□o o□o

With Exception of Maintenance Parts and Repairs Our Plant Facilities are being used for Defense Products.

THE HERMANN MANUFACTURING CO.
LANCASTER, OHIO

More than just a TRADE MARK

EXCELSIOR KNOX Woolen Co. Camden, Me. FELTS & JACKETS

BUT also a guarantee by men who for 78 years have prided themselves in making finer felts. TO YOU —this is the mark of dependability, longer felt life and greater saving.

KNOX WOOLEN CO.
CAMDEN, MAINE.

Made EXCLUSIVELY *for* PAPER

PARIS #2 *Black*

A COLUMBIAN COLLOID

Paris No. 2 Black is the easiest wetting black in the paper field. It was especially created to overcome dispersion problems associated with carbon blacks.

- free from oiliness
- optimum particle size
- high tinctorial strength
- easy to disperse
- easy to handle
- impressive uniformity

Use PARIS No. 2 Black in your black and gray paper stocks.
Compressed or Semi-Compressed for Jet Black Papers • Uncompressed for Tinting Gray Stocks

WE INVITE TECHNICAL INQUIRY

BINNEY & SMITH CO. • COLUMBIAN CARBON CO.
DISTRIBUTOR MANUFACTURER
41 East 42nd St., New York, N. Y.

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, May 19, 1943.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. The pulp is currently quoted at $40 per ton in barrels, at works; and powder is offered at $60 per ton, f.o.b., works. Demand reported fair for the week.

BLEACHING POWDER—Prices on bleaching powder are firm. Current demand reported good. Bleaching powder is currently quoted at $2.50 per 100 pounds, in drums, at works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 100 bags or more, 21 cents per pound; 20 bags, 21¼ cents per pound; less than 20 bags, 21¾ cents per pound, f.o.b., shipping point.

CAUSTIC SODA—Prices on caustic soda are reported unchanged. Demand for the current week is reported steady. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged. Demand reported fair for the current week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton at mine. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Quotations on chlorine unchanged. Government demand for war use continues heavy. Prices firm. Chlorine is currently quoted at from $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on some grades of rosin are higher for the current week. "G" gum rosin is currently quoted at $3.54 per 100 pounds in barrels, Savannah. "FF" wood rosin is currently quoted at $3.45 per 100 pounds in barrels, New York. Seventy per cent gum rosin size is currently quoted at $3.73 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand reported moderate for the current week. Domestic salt cake is currently quoted at $15 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Demand good. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch continue to be reported unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds. All prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Supply more limited for the current week. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at from $1.75 to $1.85 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices of sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $16 to $21 per ton, at mills. No quotations on imported talc.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—			
Roll, contract	*$54.00	@	—
Sheets	62.00	"	—
* OPA Maximum Price.			
Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
* OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.60	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*48.00	@	—
Chip	*45.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$10.55@$12.75	$11.70@$14.25
No. 2	9.65 " 11.75	10.80 " 13.25
No. 3	9.20 " 11.25	10.35 " 12.50
No. 4	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$15.50
No. 2 Glossy Coated	12.40	"	14.00
No. 3 Glossy Coated	11.60	"	13.25
No. 4 Glossy Coated	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset	9.60	"	11.00
A Grade E. F.	9.35	"	10.75
A Grade S. & S. C.	9.60	"	11.00
B Grade E. F.	8.85	"	10.25
B Grade S. & S. C.	9.10	"	10.50
C Grade E. F.	8.55	"	9.75
C Grade S. & S. C.	8.80	"	10.00
D Grade E. F.	8.25	"	9.50
D Grade S. & S. C.	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight to Destination.

Bl. Softwood Sulphite	$76.00
Unbl. Softwood Sulphite	65.00@ 66.00
Bl. Hardwood Sulphite	73.50
Unbl. Hardwood Sulphite	63.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich	72.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	62.00
S. Semi-Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	66.00
Unbl. Soda	62.00
Groundwood	46.00

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

New Rags (Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

* OPA Maximum Prices.

BUY WAR BONDS

KALAMAZOO
TANKS

. . . are built by men who have had years of experience with the problems of America's leading paper mills. Write for the complete details of how Kalamazoo Tanks save time and labor costs.

GLAZED TILE — KALAMAZOO TANK & SILO CO. — KALAMAZOO MICHIGAN — WOOD

WAR is
Our Preoccupation
(as long as it lasts)
but
Paper Mill Machinery
is Our Business

*

TABLE ROLLS PRESS ROLLS
MACHINE PARTS
FROM BEATERS TO CALENDERS

UNION MACHINE COMPANY
FITCHBURG, MASS.
(Associated with Union Screen Plate Company)

PRICE &
PIERCE
»»»»»»»»ltd•

Wood Pulp &
Paper Agents

60 East 42 Street
New York. N. Y.

West Virginia Pulp
and Paper Company

230 Park Ave.
New York

35 East Wacker Drive
Chicago

Public Ledger Building
Philadelphia, Pa.

503 Market St.
San Francisco, Cal.

Manufacturers of

ENGLISH FINISH SUPERCALENDERED
MACHINE FINISHED BOOK
and LITHOGRAPHIC PAPERS

Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Eggshell, Cover and Music Papers, Index Bristol, Post Card and Label Papers

HIGH GRADE COATED BOOK

. . . .

KRAFT WRAPPING AND KRAFT ENVELOPE
KRAFT LINER BOARD
BLEACHED SULPHITE AND SODA PULP
BLEACHED AND UNBLEACHED KRAFT PULP

MILLS:

Mechanicville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	@	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.57½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old Kraft Corrugated Containers	1.50	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17½	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	—	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07¼	@	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07¼	"	.07½
Washable Prints	.03¾	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	.03¼	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03½
No. 2 Mixed	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas	.04¾	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed Rope	.75	"	1.00
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Jute Corrugated Cuttings	.90	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old Corrugated Containers	1.00	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	3.75	@	4.00
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.60	"	3.85
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	—
Aust. Wool Pouches	4.65	"	4.87½
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Bagging	1.35	"	—*

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¾	"	.05
New White No 1.	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06½
Underwear Cutters, Bleached	.06¼	"	.06¾
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06½
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¼	"	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—Repacked	3.80	@	*
Miscellaneous	3.20	"	*
White No. 2—Miscellaneous	2.65	"	*
Twos and Blues, Repacked	2.20	"	—*
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—*
Miscellaneous	1.80	"	—*
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—*
No. 2	1.45	"	*
No. 3	1.35	"	*
No. 4	1.35	"	*
No. 5, Quality A	1.35	"	*
Quality B	1.20	"	*
Quality C	.95	"	*
* Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—